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GREEN MANURING.

In the seventh series of his *Études Agronomiques*, M. Grandeau, the Inspector-General of the French Agricultural Experiment Stations, publishes some interesting notes concerning the important functions of leguminous plants in the fixation of nitrogen. After alluding to the discoveries made by M. Pasteur, who demonstrated the incessant and colossal action of bacteria, which had hitherto been ascribed to chemical agency, M. Grandeau briefly describes the character of the investigations undertaken by Hellriegel and Wilfarth, whose labours were suggested and influenced by the work of Pasteur.

Hellriegel for some years cultivated various cereal and leguminous crops in sterilised soil, and added their necessary alimentation in the shape of nutritive solutions of phosphoric acid, potash, and nitrates. In the case of the cereals the resulting crop was distinctly in proportion to the quantity of ammonia placed at its disposition, and in no case did the cereals develope when supplied with nutritive solution in which nitrogen was absent. On the other hand, the leguminous plants differed extremely in their growth. In some pots the plants flourished, in others they barely existed, though the conditions were exactly similar. Upon examination, it was found that in the former case there were

numerous nodules composed of micro-organisms upon the roots, while in the case of the weakly plants the nodules were absent. In 1886, Hellriegel, after a long series of experiments, announced to the scientific world the fact of the fixation of nitrogen by the bacteria of the nodules on the roots of leguminous plants, and he held that this was the source whence these plants drew their supply of nitrogen.

M. Grandeau goes on to give an account of the nodules of leguminous plants, and of the bacteria within them.. It had been shown that plants of this kind could not exist in sterilized soil and absolutely cut off from nitrogen ; and, from experiments made by Dr. Nobbe, it was ascertained that the bacteria in the nodules of different species of leguminous plants differ essentially in their physiological properties, in that they form nodules easily on the roots of plants of the same species as those from which they originated, while they have not nearly so much influence upon allied species, and hardly any influence on the roots of leguminous plants of a widely-removed species.

Further knowledge is required as to the degree in which the bacteria of species of leguminous plants, more or less closely allied, are active in respect of the different species ot the same family, and it is especially important to have more precise information on this point, as M. Grandeau remarks that henceforth inoculation by means of soil containing bacteria should be adopted in the culture of leguminous plants; but this factor, in the opinion of Dr. Nobbe, does not yield in importance to the proper selection of mineral manures.

From the fact that leguminous plants obtain from the air, an inexhaustible and gratuitous source, the nitrogen necessary for their development, they occupy an increasingly important position among cultivated crops. Varying with the species cultivated, the nature of the soil and the climatic conditions of the season, a crop of leguminous plants fixes considerable but different quantities of nitrogen obtained from the atmosphere. These quantities vary from 53 to 134 lbs. per acre. If a leguminous crop is dug in green, the amount of nitrogen resulting from it, according to M. Grandeau, is equivalent to

a good dressing of nitrogenous manure—nitrate of soda, sulphate of ammonia, or farmyard manure. If the foliage of the plants is utilised for cattle, the stems and roots remaining in the ground contain enough nitrogen to ensure a full yield of cereals or other plants.

An interesting account is given by M. Grandeau of the results of the inoculation of soil with bacteria adapted to the different leguminous plants, which, he shows, may increase enormously the assimilating power of these plants. Inoculation is accomplished by broad-casting on the land to be planted varying quantities of finely comminuted earth taken from a field which has borne a crop of the same species of leguminous plant which it is intended to cultivate. Among numerous experiments in this direction, M. Grandeau cites some made by Professor Frühweh at Mædling with yellow lupins, serradella, *Ornithopus sativus*, and *Lathyrus silvestris*, in calcareous soil. Of two plots of land planted with serradella, one was treated with a small quantity of earth impregnated with bacteria from previous cultures, and the other was not so treated. On the 9th of August it was found that the crop on the plot that had been inoculated was more than three times the weight of that on the plot not inoculated. In the former case the roots of the serradella were covered with nodules, in the latter case they were absolutely wanting.

The land on which the lupins were grown was inoculated with earth from soil that had previously borne lupins. On one plot the quantity of impregnated earth equalled about 8 cwts. per acre, and on another 16 cwts. per acre; the third plot was not inoculated. The plants on the first plot reached an average height of $15\frac{3}{4}$ inches, and the weight of the crop on this plot was double that on the plot not inoculated. The crop on the second plot was more than one-third larger than that on the first plot, and three times larger than that on the plot not inoculated. Inoculation had apparently doubled and trebled the crops according to the quantity of bacteria-infected earth supplied. M. Grandeau states that the result of the experiments on two other beds equally demonstrated the advantage of inoculation.

In some other experiments the quantities of bacteria-infected earth applied ranged from half a ton up to one-and-a-half tons per acre, and the results were equally marked; but, as M. Grandeau admits, there are many questions as to the influence of the inherent fertilising qualities of different soils, as to the effect of this or that leguminous plant, and as to the quantities of earth to be employed for purposes of inoculation, which require continued investigation. Nevertheless the value of the process seems to be sufficiently established, and it may be adopted by practical men, especially as it it involves but slight expense, and its results promise to be most advantageous to agriculturists.

Experiments can be made in two ways:—1st, by broadcasting some hundredweights of earth taken from land that has yielded a good leguminous crop, upon the field which is to be sown with leguminous plants. 2nd, by watering the field with water which has been in contact with earth from land which has yielded a good leguminous crop.

There is yet a third method of inoculation, namely, by means of the preparation known as "Nitragin," to which M. Grandeau does not allude in the *Etudes Agronomiques*. This, however, appears to be even more simple and economical than either of the methods described by him, and it only remains to ascertain its actual value from the results of various experiments which are being conducted by scientific agriculturists in this country, and by investigators and cultivators in Germany. "Nitragin" is the pure culture of the nodular organisms found on the roots of leguminous plants; the method of obtaining these was discovered by Dr. Nobbe, of Tharand, in Saxony. The culture is placed in a bottle containing a nutrient solution, as agar gelatine, upon which it grows, and the bottle is hermetically sealed and kept from the light. "Nitragin" can be obtained in this condensed bottled form, derived from the nodules of several species of clover, lupins, beans and peas, tares, lucerne, sainfoin, and other leguminous plants, and suitable for application in order to promote and stimulate the growth of crops of the same species as that from which it was evolved. If this new and

direct mode of inoculation should prove satisfactory, it will be a distinct advantage over the methods described by M. Grandeau, as the application is simple and inexpensive, and the inoculation of each kind of leguminous plant with its own peculiar organism can be easily ensured.

In connection with the various methods that have been described for the purpose of supplying nitrogen to leguminous plants by means of their specific organisms, it must be borne in mind that these processes will not produce satisfactory results unless there is a proper supply of organic and mineral manures, as potash, lime, and phosphoric acid, in the soils on which the crops are cultivated.

M. Grandeau has a long chapter showing how the power of assimilation and fixation of nitrogen has been most extensively and beneficially utilised in Germany by M. Schultz, who has made sterile land fertile, and turned a waste into fruitful fields, by a system of green manuring (*engrais verts*)—ploughing in leguminous plants of several kinds, but mainly lupins. M. Schultz's experiments were made at Lupitz, in Saxony, upon light sandy soil, which naturally only yields a crop when plenty of manure is supplied, and then the produce barely covers the outlay. In rainy seasons M. Schultz noticed that this poor land produced luxuriant growths of yellow, white, and blue lupins, and it occurred to him that it might also be possible to make it yield other crops suited for the food of man. After forty years of continuous experiments he has formulated a system of cultivation which has completely transformed land considered *quasi* barren in 1855, into fertile soil growing remunerative crops.

The basis of this transformation is the cultivation of leguminous plants, notably lupins, in alternation with cereals, potatoes, and other crops, and the rational use of mineral manures, lime, potash, and phosphoric acid, but without any direct application of nitrogenous manures. This system has answered so well that intermediate cropping with leguminous plants has now extended over the whole of M. Schultz's estate of 600 acres. This system is known throughout Germany as the Lupitz method of

manuring by the ploughing in of intermediate crops of leguminous plants, which not only cause the fixation and accumulation of nitrogen in the soil, but supply the soil with mineral constituents and at the same time, by the very deep penetration of the roots of the plants, especially lupins, into the subsoil, enable the roots of succeeding crops to go deep down in search of food.

At a conference held in Dresden in 1891, M. Schultz summed up the results of his experiments succinctly in the following terms :—" With a limited stock of fatting cattle, without buying any nitrogenous manures, by adding potash, phosphoric acid, and lime, I have succeeded in fixing at the expense of the atmosphere a considerable quantity of nitrogen, by which I have been enabled to diminish by 50 per cent. the expense of the production of cereals grown at Lupitz, or, which comes to the same thing, to raise the average profit to 30s. per acre, notwithstanding the unfavourable state of the markets."

Details are given by M. Grandeau of M. Schultz's experiments with no less than thirty species of leguminous plants, with the object of discovering the most suitable for his purpose. Among these were *Lathyrus clymenum*, peas, white, blue, and yellow lupins, mixed, in some cases, with other plants, as rape, mustard, and winter turnips. These being cut when in flower—the flowering period or soon after being the proper time for ploughing in the green manure—were severally analysed.

Taking together the leaves and roots of six different leguminous plants, the results of the analysis are given below :—

Name of Plant.	Dry Substance per Acre.	Fixed Nitrogen per Acre.	Equal to Nitrate of Soda per Acre.
	Lbs.	Lbs.	Lbs.
Lathyrus clymenum -	5,100	154	1,000
Peas - - - -	7,140	198	1,267
Mixed leguminous plants -	5,998	165	1,028
Lupins, white - -	6,273	162	1,039
Lupins, blue - - -	7,020	171	1,081
Lupins, yello - -	5,090	130	847

This table shows that the crop of peas ploughed in was equal in manurial value to more than half a ton of nitrate of soda per acre, and was in this respect much superior to all the other crops. Blue lupins gave the next best return, as represented by an equivalent of value in nitrate of soda; but it must be noted that in the case of the peas the amount of dry substance required to yield the equivalent of 1,267 lbs. of nitrate of soda, or 7,140 lbs., was proportionately less than in the blue lupins, whose equivalent value in the form of nitrate of soda was 1,081 lbs., from 7,020 lbs. of dry substance. M. Grandeau states that another great advantage of this system of green manuring is that the nitrogen supply is gradually evolved as the buried substance decays, and is therefore available for the use of the crop throughout its growth.

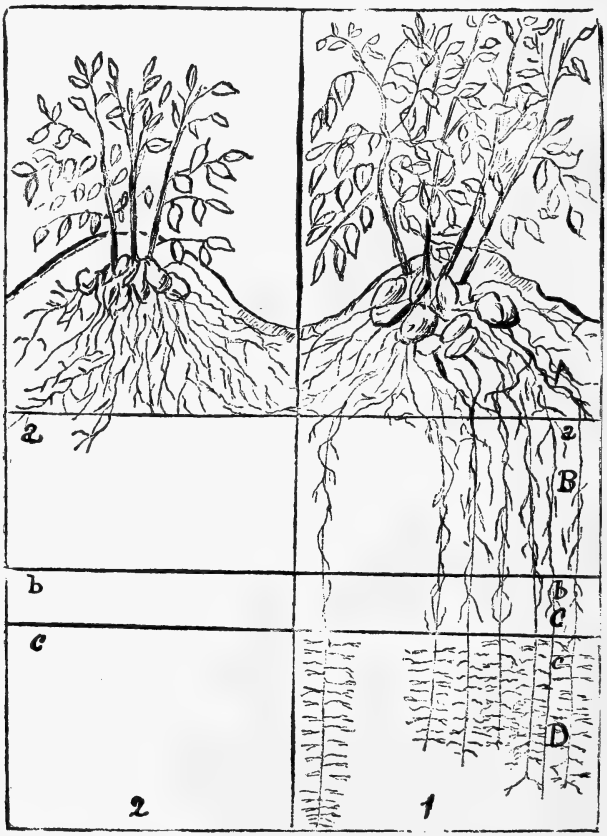
Allusion has been made to the mechanical action upon the soil of the roots of leguminous plants, which, as M. Grandeau puts it, exercise a considerable influence upon the fertility of land. This was not realised in any way until the important experiments at Lupitz had proved it in a striking manner. From these experiments it appears that when rye succeeded a crop of lupins its roots penetrated over three feet into the earth, and the roots of potatoes descended still deeper; but upon land adjoining, manured with farmyard manure, and not having had a previous crop of lupins, the roots of rye descended only between 16 and 24 inches.

The results of experiments in this direction are graphically shown by the figure on the next page.

This figure is reproduced from a photograph of deep sections of two fields together 37 acres in extent, cultivated for the potato crop with and without green manuring.

The letters A, B, C, D denote the nature of the strata of soil and subsoil of Field 1 through which the roots of the lupins of the previous crop had made channels, and facilitated the passage of the roots of the potato plants. Following these channels, the roots of the potato plants got into D, which on account of its depth had retained moisture. This caused them to spread laterally in an extraordinary manner,

as shown in the figure, and the potato plants were thus supplied with water, thereby assuring the success of the crop, which equalled 9 tons per acre of well shaped, good cooking potatoes. The yield of Field 2, which had not been green manured, was only 6 tons per acre. The tubers contained more starch than those from Field 1, but they were less shapely and not so good for cooking. The cost of manuring Field 1 was about 19s. per acre. That of Field 2 was close upon £3 12s. per acre.



Experiments with rye gave similar results. After lupins the rye plants attained heights ranging between 47 and 67 inches, the roots were 45 inches long, and the yield per acre was about 14 cwts. of grain. Rye grown after potatoes only attained the height of from 27½ to 38 inches, the

length of their roots varied from 20 to 24 inches, the crop was only equal to 6½ cwts. of grain per acre.

Of the various leguminous plants tried by M. Schultz, the roots of the blue lupins penetrated most deeply into the soil. The white lupin came next in this respect, and slightly surpassed the blue lupin in the fixation of nitrogen. The yellow lupin was not quite so good as the other species of lupin, while peas, though they exceeded the lupins in the fixation of nitrogen, did not penetrate the soil with their roots more than from 9¾ to 12 inches. The different varieties of *Lathyrus* came next in value, and though they were not equal to lupins they might be used instead of them. M. Grandeau is himself experimenting with regard to green manuring in France, and the results of his experiments will be looked for with much interest.

Records of experiments upon several Norwegian farms with lupins and other nitrogen assimilating plants have been recently published by Dr. Larsen.[1] The principal subjects of experiment were crops of potatoes and oats taken after lupins ploughed in green in some cases, and in other cases harvested. The soil was of a poor sandy nature, and superphosphate, basic slag, and nitrate of potash were applied. In most cases the whole crop of lupins was ploughed under, but in one case it was harvested, and only the stubble and roots ploughed under. The results were not so satisfactory as in M. Schultz's experiments, and indicate that the crop of lupins ploughed under was not able to supply sufficient nitrogen for the potato crop, as on several trial plots an increased amount of nitrate of potash added to the yield of potatoes.

Inoculation, or infection, was also tried by applying to each acre of the land to be sown with lupins from 132 to 396 bushels of soil which had borne a crop of lupins. From these experiments it is considered by Dr. Larsen that 264 bushels per acre of lupin-infected soil is sufficient to obtain a good return of lupins, and that 132 bushels will often prove

[1] Dyrkning af Lupin og nogle andre Kvœlstofsamlere af Forsogsleder Bastian Larsen. Tidskrift for det norske Landbrug, 1896. Published at Christiania by Grondahl and Sons.

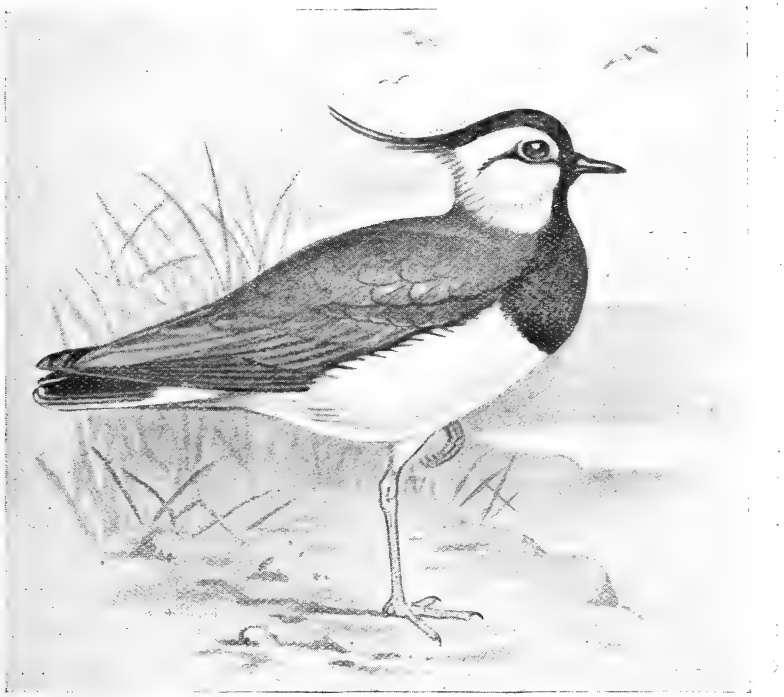
sufficient. It will be noticed that this amount of lupin-infected soil is enormously in excess of the quantity used by M. Schultz, and would render the operation far more tedious and costly. It seems to indicate that in Dr. Larsen's experiments the land was not so thoroughly infected with lupin-bacteria as in the trials at Lupitz by long-continued lupin-cultivation. The conclusions at which Dr. Larsen arrives are that infection with lupin-bacteria does not help the growth of other leguminous plants, but that on the other hand, lupin-bacteria, or soil infected with lupin-bacteria, added considerably to the yield of lupins, which appears to prove that each leguminous plant requires its peculiar or symbiotic bacteria to influence its growth.

Dr. Dehlinger carried on experiments near Darmstadt in 1891 with green manuring upon soil of quite a different character from that employed at Lupitz or in Dr. Larsen's experiments in Norway, some of it being loamy, and some loamy with a mixture of sand, having considerable natural fertility. Upon taking this land in hand, Dr. Dehlinger got rid of the live-stock, and instead of farmyard manure adopted "green manuring" with most satisfactory results, obtaining good crops at a greatly diminished cost.

There have been other experiments in Germany under the superintendence of Dr. Salfeld, and in Sweden directed by Dr. Von Feilitzen, of a more or less successful character, and others are now in progress, which it is hoped will lead to more definite knowledge upon a subject so important to agriculturists.

THE COMMON LAPWING, PLOVER, OR PEEWIT

Vanellus cristatus (vulgaris).



This bird is familiar to most persons in Great Britain and Ireland, being found in every county. It breeds in marshes, moors, meadows, and fallows, and is seen in large flocks in the autumn and winter, but in the breeding season the flocks are not nearly so large as at other times of the year. In the adult bird the beak, crown of the head, and the tuft are black; the back and wing coverts are also black, tinged with purple and copper-colour; the lower part of the breast and the belly are white, and the claws are black.

The nest of the lapwing or peewit is a mere hole or depression in the surface of the ground, either in grass land or arable

land, with a few bits of dried grass, bents, or rushes at the bottom. The olive-coloured eggs with black blotches, familiar to everyone, are usually four in number, and are keenly sought after in districts frequented by these birds, to supply the great demand for them as luxuries of diet. Such high prices are paid for plovers' eggs, especially in the early part of the season, that the natural increase of the birds is largely interfered with, and the multiplication of insects injurious to crops is the consequence. Selby says that the trade of collecting the eggs continues for about two months, and that great expertness in the discovery of the nests is shown by those accustomed to it, who generally judge of their situation by the conduct of the female birds, as the latter, upon being disturbed, invariably run from the eggs, and then fly near to the ground for a short distance, without uttering any alarm cry.

No other bird is so beneficial to cultivators as the lapwing. It devours snails, wireworms, beetles, aphides, the larvæ of various insects that infest grass, turnips, wheat, and other crops, and other pests. As it feeds in the evening, it has opportunities of getting at many insects which commit their depredations after sundown. On account of their insectivorous habits peewits are sometimes kept in gardens, where their valuable services are highly appreciated.

Peewits are killed for food to some extent, though they are not particularly palatable. They are, however, protected in close time throughout Great Britain by the Wild Birds' Protection Act of 1880. The eggs are protected, by the adoption of the Wild Birds' Protection Act of 1894, in a few counties in Scotland; but this Act has not been adopted hitherto in England and Ireland so far as concerns plovers' eggs, though in some counties there is a movement on the part of agriculturists for the protection of the eggs of one of their best friends. The following testimony of Curtis, the great economic entomologist, may be cited in favour of these birds:—"In the marshy districts of our Eastern counties," he says, "the plover, or lapwing, called also 'pewit,' was formerly exceedingly abundant, as well as the ruff and ree, but the gun and nest-hunter have so thinned their numbers

that the lapwing is becoming scarce, and the latter have almost abandoned our shores, and, as might be expected, the wireworms seem to be increasing rapidly in such localities. On opening the lapwings that have been shot, their crops were full of wireworms; and as it is supposed that one bird would eat a hundred in a day, the flocks of forty, fifty, and upwards that were constantly to be seen some years since would clear off a very large number in a season. Their assistance, however, is departed and gone for ever, for the high price which the eggs fetch in the market cause the peasantry to look so carefully after the nests, that the only chance that the lapwing has of escaping destruction is to seek the wildest districts of Scotland and Ireland, where their eggs not being so essential a luxury as they are considered in England, they may escape the persecution they have so long endured. Whether this destruction of late years of whole fields of corn at Oxborough, near Stoke, in Norfolk, is attributable to the absence of these birds, I cannot say; but it is certain that formerly the plover abounded in that neighbourhood, and now scarcely a pair can be seen." Since Curtis wrote these words, in 1845, in the Journal of the Royal Agricultural Society, the demand for lapwings' eggs has greatly increased, and the annual search for them is even more persistent than it was fifty years ago.

OUR IMPORTS OF DAIRY PRODUCE.

Our aggregate imports of all kinds of dairy produce in the past year were valued at nearly £24,000,000, including £15,344,000 for butter, £2,500,000 for margarine, £4,900,000 for cheese, and £1,178,000 for condensed and fresh milk and cream. Twenty years ago the value of our receipts of these products, omitting milk and cream, amounted in the twelve months to about £13,956,000, of which £9,718,000 was for butter and butterine, and £4,238,000 for cheese. Thus, between 1876 and 1896 the estimated expenditure of the United Kingdom in the purchase of manufactured products of foreign and colonial dairies, and of margarine, has increased by about £10,000,000. During the same interval, the aggregate annual importation of these articles has nearly doubled, viz., from 3,191,000 cwts. to over 6,208,000 cwts., the greater part of the difference having been credited to butter and margarine, the entries of which have risen from 1,659,000 cwts. to 3,900,000 cwts. whereas those of cheese have risen from 1,531,000 cwts. to 2,245,000 cwts. In other words, the volume of foreign and colonial milk imported into this country in the form of butter, cheese, and margarine (reckoning a pound of margarine as being equivalent to a pound of butter) has expanded from 682 millions of gallons in the earlier year mentioned to 1,453 millions of gallons in 1896. If these figures are applied to the declared values of the articles concerned, it would appear that the milk received last year in the form of butter was valued at nearly 4d. per gallon, while that received in the shape of cheese was of the estimated value of nearly 4¾d. per gallon.

Hitherto we have been dealing with the gross imports, and although the exportation of dairy produce from our shores is of comparatively insignificant dimensions, a more accurate appreciation of the extent of the consumption in this country of foreign and colonial milk products and of

margarine will be obtained by a comparison of the net receipts of these articles with the estimated population. The following statement shows the quantities of imported butter, cheese, and margarine retained for food annually at intervals of five years since 1876.

Year.	Butter.	Margarine.	Cheese.
	Cwts.	Cwts.	Cwts.
1876	1,636,000	*	1,486 000
1881	1,983 000	*	1,800,000
1886	1,481,000	870,000	1,685 000
1891	2,071,000	1,225,000	1,976,000
1896	2,980,000	914,000	2,192,000

* Included with butter.

If butter and margarine are taken together, a calculation based on the above figures shows that the supply of these articles available for consumption has increased from 5·5 lbs. per head in the earliest year to 11·1 lbs. per head last year. Foreign and colonial cheese has not met with a corresponding demand, for the net imports per head have increased by only one-fifth, viz., from 5 lbs. to 6·2 lbs. per head. Prior to 1886 the entries of margarine were not separately distinguished; between that year and 1892 the net quantities entered rose from 2·7 lbs. to 3·7 lbs. per head of the population, but they have since steadily diminished, and amounted to only 2·6 lbs. per head in 1896. Butter, on the other hand, has reached our ports in annually increasing consignments, the net imports during the past decade having risen from $4\frac{1}{2}$ lbs. to $8\frac{1}{2}$ lbs. per head.

From the above figures some idea may be obtained as to the number of cows which would be required to furnish the supply of imported butter and cheese. Our aggregate net imports of these two articles last year amounted in milk to about 1,157 million gallons, and this would represent, in this country, the produce of 2,892,500 cows, assuming that the yield of milk from an average cow, allowing for differences in the period of lactation, amounts to about 400 gallons per annum. At the same rate of production the total yield of milk from

the dairy herds of the United Kingdom in 1896 works out to nearly 1,600 million gallons.[1] Thus, excluding the imports of margarine and of fresh and condensed milk, the volume of milk in all forms available for consumption in the past year amounted, on the basis of the calculation already adopted, to about 2,700 million gallons, and to produce the whole of this supply a milking herd of nearly 7,000,000 cows would be required.

In 1886, the year when butter was first separately distinguished in the Trade Returns, Denmark and France each contributed about 26 per cent. of the entire importation, but while the supply from the former country now constitutes over 40 per cent. of the total quantity entered annually, the consignments from French dairies have fallen to about 15 per cent. Butter has also been shipped to this country in considerable quantities from Holland; these shipments declined with the growth of the Dutch margarine trade, but there has been a recovery in recent years, and they now form about 8 per cent. of the yearly importation. Swedish producers contribute about 11 per cent. of our present annual imports, and a similar proportion was received from Australasia in 1895. The average value of the butter imported from all sources last year was £5 1s. 0d. per cwt, or nearly 11d. per lb.

The bulk of the importation of cheese is supplied by Canada and the United States. Until 1891 the latter country contributed the major portion of the transatlantic supply, but during the past few years our annual consignments from the Dominion have been about twice as heavy as those from her southern neighbour. In 1876 the entries of Canadian cheese amounted to about a quarter of a million cwts.; last year they exceeded this quantity by nearly a million cwts. During the same period our receipts of cheese from the United States have fallen from about one million cwts. to nearly half this quantity. Dutch cheese, which

[1] There are no official data as to the production of milk in the United Kingdom. The estimate adopted above is probably in excess of the actual quantity yielded, as an allowance must be made for a certain percentage of non-productive cows. The number of cows and heifers in-milk or in-calf in the United Kingdom is 3,959,087.

formed about one-fifth of the total importation in the earlier year mentioned, is also relatively in smaller demand in this country than was formerly the case, as the imports of this variety now constitute about one-eighth of the entire annual receipts. The average value of the cheese imported from all sources in 1896 was 43s. 8d. per cwt.; that from the United States was valued at 42s. 6d., and Canadian at 42s., per cwt.

Nearly the whole of the foreign margarine consumed in the United Kingdom is made in Holland, the Dutch manufacturers having enjoyed practically a monopoly of the trade with this country during the past decade, but the quantity imported has declined since 1892. The average value of this imported product in 1896 was nearly 54s. per cwt.

Fresh milk and cream were imported in comparatively large quantities in 1894 and 1895; but this trade, which attracted some attention at that time, shows few signs of becoming permanent. In 1894 the quantity imported was 161,600 gallons, in the following year there was a total importation of 127,000 gallons, and last year the receipts amounted to only 22,776 gallons. The bulk of our supply of foreign milk and cream has been furnished hitherto by Holland and Sweden, the latter country having contributed the greater quantity. Condensed milk was first distinguished in the Trade Returns in 1888, and the imports have increased annually from 352,000 cwts. of the value of £735,000 to 611,685 cwts. of the value of £1,172,000 last year.

We may now proceed to review briefly the principal features of dairy-farming in the several countries which contribute to the imports of manufactured milk products. Among our foreign and colonial purveyors of butter, Denmark occupies the premier position, and her share of this trade has been steadily growing during the past ten years. In the same period the stock of cows on Danish farms has increased from about 900,000 to over 1,011,000, so that it now numbers about 450 per 1,000 of the population of the country. (In the United Kingdom the estimated number of cows and heifers in milk or in calf represents about 100 per 1,000 of the population.) The cultivated

area of Denmark, according to the latest official returns, is 7,062,000 acres, of which 3,029,000 acres are under corn crops, 3,082,000 acres under permanent and rotation grasses, 130,000 acres under roots and 129,000 acres under potatoes, and 47,000 acres under spurrey. The Danish agricultural statistics for the past twenty years, show that there has been a large extension of the arable acreage under fodder crops and of that under spurrey and roots ; but the remarkable development of the dairying industry, and in a lesser degree of pig-keeping, has created a greater demand for natural and artificial feeding stuffs than could be satisfied by the productive capabilities of the country, and there is consequently a considerable importation of oil-cake and bran.

In 1895-96 the net exports of butter from Denmark amounted to 99,000,000 lbs, this being 72,000,000 lbs. in excess of the quantity exported eleven years ago.[2] The great extension of dairying indicated by these figures has been closely connected with the growth of the co-operative movement among dairy-farmers. It is estimated that there are now 1,000 associations of Danish farmers engaged in the manufacture of butter, principally for the British market. A full account of the system upon which the co-operative dairies are worked has already been published by the Board of Agriculture,[3] and it may be sufficient to state here briefly that these establishments are, as a rule, erected by co-operative associations of farmers keeping cows, the necessary capital for the initial outlay being usually borrowed on the joint security of the members. When the building debt incurred by a society has been extinguished, the assets are apportioned as shares among the members in the proportion to the quantity of milk delivered by each. The whole of the

[2] The net exports of butter in each year since 1884-85 have been as under :—

	Lbs.		Lbs.
1884-85	27,242,000	1890-91	77,610,000
1885-86	35,457,000	1891-92	75,960,000
1886-87	38 593,000	1892-93	78,956,000
1887-88	51,950,000	1893-94	91,023,000
1888-89	56,885,000	1894-95	87,995,000
1889-90	72,043,000	1895-96	99,294,000

[3] Reports upon Dairy Farming in Denmark, Sweden and Germany. C. 7,019.

milk produced on the farm of each member, with the exception of the small quantity required for the household, is consigned to the dairy of the society to be made into butter, the milk being separated by the centrifugal process. The milk is paid for periodically, and at the end of the year the surplus profits, after the payment of 5 per cent. on the shares, are divided in proportion to the quantity of milk delivered by each member during the twelve months. Members are generally required to take back the separated milk and butter milk at a price fixed by the association.

It is contended that the adoption of the co-operative system has enabled Danish farmers to produce a butter of uniform texture and quality, and that it has largely reduced the cost of production. In this connection reference may be made to some interesting examples of the balance sheets of Danish dairies, contained in the *Tidskrift for Landokonomi*. In one of these, which relates to a large co-operative dairy in Jutland, the actual working expenses for the twelve months ended October, 1896, calculated upon 100 gallons of milk, amounted to 4s., the sum paid to shareholders for the milk supplied during the year was 33s. 9d., and the receipts from sales of butter, cheese and bye-products amounted to 44s. 2d., so that the return to the shareholders for every 100 gallons of milk was 40s. 2d., or about 5d. per gallon.[4] The balance-sheets of another co-operative dairy in the island of Fünen for the same year show a net return to the shareholders of just under 5d. per gallon.

Co-operation has been applied with success to many branches

[4] The loan incurred by the association for the erection of the dairy buildings has been paid off. The accounts for the year are shown as follows :—

Receipts.	£	Expenditure.	£
Sale of butter - - -	7,994	Milk (473,000 galls.) - -	7,980
Sale of cheese - - -	592	Wages, £198 ; Cartage, £254	452
Sale of milk and cream - -	24	Coal, ice, salt, colouring matter, etc. - - -	127
Receipts from skim milk and butter milk sold to members	1,796	Appliances and repairs - -	299
Other receipts - - -	42	Interest - - - -	51
		Other expenses - - -	15
		Profit - - - - -	1 524
Total - - - -	1 ,448	Total - - - -	10,448

of agriculture in France; but co-operative dairies in that country were practically unknown until quite recent years, and their number did not exceed 100 at the end of 1895. These establishments are, however, principally engaged in the home trade, the greater part of the French butter produced in Normandy and Brittany for export being prepared in what are known as blending factories, which are owned mainly by the large export houses. In these factories the butter collected from the farmers in the neighbourhood is graded and mixed by machinery in order to obtain a product of uniform colour and quality. A full description of the methods of manufacture followed in Normandy will be found in another part of this journal, p. 70.

According to a recent estimate of the French Minister of Agriculture the number of cows in the Republic is 6,360,000, and the annual production of milk is about 1,716 million gallons, or 270 gallons per cow. The exports of butter from France in 1895 amounted to 511,546 cwts. In 1895 the value of the milk produced was officially estimated at about 6¾d. per gallon, and the value of the butter exported was put at about 8¾d. per lb. for salt and 11¾d. for fresh butter, or 3¼d. and 4¼d. respectively per gallon of milk employed.

In Sweden, co-operative dairies have been established in districts in the south-west, and they now number 302 as compared with 73 in 1891. There are over 700 estate dairies and about 500 commercial dairies in different parts of the kingdom, the latter being run for the most part by joint-stock companies purchasing milk from the farmers. In 900 of these establishments the cream is separated by centrifugal separators, and in 500 of them the Schwartz process of separation is employed. The exports of Swedish butter amounted in 1895 to 53,000,000 lb.; about 60 per cent. of it is consigned directly to the United Kingdom, nearly all the remainder is shipped to Denmark, whence a considerable quantity is again exported to British ports. According to the latest official estimate the number of cows in Sweden is 1,683,116, or about 345 per 1,000 of the population.

Dutch butter does not now form more than eight per cent.

of our annual imports, but it formerly held a more important position in the markets of this country. It is noteworthy that the decline of the export trade in butter from the Netherlands has been concurrent with a great development of the manufacture of margarine. The exports of the latter have only been separately distinguished from those of butter in the Dutch trade returns since 1890, but they apparently reached their greatest dimensions in 1892, when they amounted to 135,000,000 lbs; they have, however, since declined to less than 100 million lbs. During the past five years the quantity of Dutch butter exported annually has averaged about 29,000,000 lbs. Holland's largest customer for both natural and artificial butter is the United Kingdom.

In 1891 there were 32 large margarine factories in operation in the Netherlands. The factories differ greatly in size and capacity, but all of them are equipped with modern machinery and appliances, and those of comparatively recent construction represent large investments. A representative factory, situated in North Brabant, providing employment for 200 men, is said to produce and ship regularly 25 tons of margarine weekly. It consumes each week an average of 33,000 gallons of milk: the yield of 10,500 cows, owned by 2,000 small farmers living in the adjacent rural districts. The number of cows in Holland is 877,200, or 185 per 1,000 of the population.

Although German butter reaches our markets in consignments amounting in the aggregate to over 100,000 cwts. annually, Germany has really produced in recent years barely sufficient quantities of this article to meet the needs of her own population. About 80 per cent. of the butter exported is sent to the United Kingdom, and the remainder is mainly consigned to Denmark. The imports are drawn chiefly from Austria-Hungary, Russia, and the Netherlands, but in 1896 about 18,000 cwts. were credited to the United States.

Butter-making in Germany is chiefly carried on by co-operative dairy societies, which are run very much on the lines of similar associations in Denmark. It is estimated that there are about 1,300 of these societies in

various parts of the Empire the greater number being situated in the northern provinces. In most of the co-operative dairies the cream is separated from the milk by the centrifugal process and manufactured into butter, the skim-milk and butter-milk being returned to the members.

In 1892 the number of cows in Germany was 9,946,000, or 198 per 1,000 of the population.

Some particulars have already been given above of the results shown by the balance-sheets of typical Danish co-operative dairies, and it may be interesting for purposes of comparison to notice here the accounts of two co-operative dairies in Germany, one of which is situated in Mecklenburg and the other in Hanover. The former is the property of a society consisting of 23 members holding 1,400 cows. The quantity of milk dealt with by this dairy in the year ended June, 1895, was 646,209 gallons. Practically the whole of the cream was manufactured into butter, and a large quantity of the separated milk was used for the manufacture of cheese. The working expenses, including interest on capital sunk and a payment to the reserve fund, were £1,835, or 5s. 8d. per 100 gallons of milk. The price paid to the members for milk supplied during the year was 39s. 8d. per 100 gallons, and the receipts were 45s. 9d. per 100 gallons of milk. Thus, in this case the total returns to the shareholders amounted to nearly 5 pence per gallon of milk.

The dairy in Hanover is a smaller concern, manufacturing butter only. In 1895 the quantity of milk manipulated was 315,478 gallons, which was paid for at the rate of 27s. 11d. per 100 gallons. The working expenses, including interest, capital, and depreciation, amounted to 5s. 2d. per 100 gallons, and the total receipts to 33s. 11d. per 100 gallons, so that the sum received by the members worked out to about 3½d. per gallon, but in addition they received from the dairy, free of charge, 70 per cent. of the separated milk and butter milk.

The bulk of the butter exported to the United Kingdom from Australasia is the produce of Victoria, where there has been a great extension of dairying since the introduction of butter factories about eight or nine years ago; the erection of these establishments having been promoted

by Government grants in the shape of subsidies and bonuses, which, however, have been discontinued since 1893-94. In 1895 there were 155 butter and cheese factories working in the colony, and they produced nearly 27,000,000 lbs. of butter out of an estimated total production of 35,580,000 lbs.

The factory movement is also beginning to spread in the other Australian colonies. In Queensland, factories or creameries have been established wherever milk is procurable in any quantity, there being 50 of these establishments in the southern part of the colony in 1894. A similar development is taking place in New South Wales and South Australia. In the former colony the co-operative dairies are gradually being superseded by large butter factories, which are supplied with cream by numerous creameries.

The export trade in butter from the last three mentioned colonies is, however, as yet, of insignificant proportions. In New Zealand, whence we received 56,000 cwts. of butter last year, butter factories and creameries are being established in increasing numbers annually, and it is estimated that there are now about 208 of these establishments in operation.

American butter has hitherto constituted a very small proportion of our imports of this commodity, but in recent years the receipts from the United States have been of increasing dimensions, and in 1896 they amounted to about 142,000 cwts. The transatlantic traffic in dairy produce is, however, made up for the most part of heavy consignments of cheese to the British market. Until 1891 the larger share of this trade was enjoyed by the United States, but during the past six years Canada has been the principal contributor. The bulk of the cheese exported from the former country is made in the State of New York, which has contributed about 79 per cent. of the exports of this product from the United States during the past five years. In several years prior to 1886 the exports of cheese from American ports exceeded one hundred million pounds, but during the past decade they have steadily declined, and in the twelve months

ended June, 1896, they amounted to only 34 million pounds. In 1890 it was estimated that about 50 per cent. of the cheese manufactured in the United States was produced in the State of New York, and that is probably the proportion at the present time. The magnitude which the industry has attained in New York is explained by the fact that it was in this State that the factory system of cheese-making was first introduced, and it is here that it has found its greatest development. According to an enumeration made by the Commissioner of Agriculture, there were 1,032 cheese factories and 311 creameries in existence in the State in 1894. The factories vary in size: an average establishment produces from eight to ten cheeses a day, but some make only five or six cheeses daily, and others make as many as twenty-two a day in the height of the season. The milk is usually drawn from farms within a radius of between two and three miles from the factories. The latter are sometimes owned by single proprietors, but the greater number are joint-stock concerns. In either case the system of management is the same: the farmers supplying the milk are credited with the total weight of milk supplied, which is paid for according to the quantity required to make one lb. of cheese, on the basis of the selling price per pound of the manufactured article. Few factories have adopted the method of paying on the basis of the fat contents of the milk. The manufacturing season extends as a rule from April to November.

The total quantity of butter exported from the United States was nearly 12 million pounds in 1894; in the following year it had decreased to 5,600,000 lbs., and in 1896 it amounted to 19,400,000 lbs. About 85 per cent. of the butter produced in the country is made on farms, although in the eastern States there is a considerable number of creameries and factories. The estimated number of cows in the United States in 1896 was 16,138,000, or 226 per 1,000 of the population.

The United States has for many years furnished the bulk of the oleo oil, neutral lard, and cottonseed oil for the European margarine industry, but manufactured margarine is not exported in any quantity from America.

We have already seen that Canada has recently succeeded in securing the greater share of the foreign cheese trade of the United Kingdom. In 1880 the total exports of cheese from the Dominion amounted to 40,000,000 lbs.; ten years later the quantity exported was 94,000,000 lbs., and in 1895 it was 146,000,000 lbs. Canadian butter on the other hand is exported in comparatively small quantities, the average annual exportation having been about 5,000,000 lbs. during the past five years. The number of cows in Canada in 1891 was 1,857,000, or 384 per 1,000 of the population.

The bulk of the cheese produced in the Dominion is manufactured in factories of which the greater number are owned by joint stock associations of farmers. A large number of cheese factories have recently been equipped with plant for the manufacture of butter during the winter. This movement in the direction of winter dairying was practically begun by the establishment in Ontario of two co-operative dairies in 1891, and similar establishments for the production of butter have now sprung up in Quebec, Nova Scotia, and Prince Edward Island. As a result of the extension of winter dairying great efforts are being made to expand the trade in creamery butter with the United Kingdom, and the Government of the Dominion has made arrangements for a chain of cold storage service from the producers in Canada to the consumers in Great Britain, in order that the butter may be marketed in good condition. As a further stimulus to the development of the creamery system the Canadian Parliament has recently appropriated a sum of £3,125 for the establishment and maintenance of creameries in the North-west Territories. The amount voted is to be distributed in loans to joint stock companies of farmers, or to butter and cheese manufacturing associations, for the equipment of creameries and skimming stations. The companies or associations are required to provide the necessary buildings and also to guarantee a supply of milk from at least 400 cows. The Government undertakes the management of the establishments for the equipment of which these loans are advanced, and not only manufactures but also markets the butter at a charge to the company or association of 2d. per lb. This

arrangement continues until the loan is repaid, when the equipment of the creamery is vested in the parties to whom the loan was originally made.

From this short review of the systems and processes pursued in the several countries and colonies which supply the markets of the United Kingdom with dairy produce, it is clear that one feature which is more or less common to them all is the concentration of the manufacture of butter and cheese in large dairies and factories, co-operative or otherwise, drawing their supplies of the raw product from a number of farms situated within a convenient radius. In the greater number of these establishments the whole of the processes of manufacture are carried out on the premises, but some of them are equipped only for the manipulation of the cream, and in Normandy and Brittany the butter factories confine their operations to the blending and grading of the manufactured product. The object of all is, however, the same, viz., the production of an article of uniform quality and appearance at the lowest possible cost, and the facts illustrated by our import statistics afford *primâ facie* evidence that the factory system has worked with success abroad, especially in countries where it is combined with co-operative principles, of which Denmark is a notable example.

In conclusion, attention may be directed to the progress of co-operative dairying in Ireland, a detailed account of which has already appeared in an earlier number of this Journal.* According to the latest report of the Irish Agricultural Organisation Society the dairy societies, or creameries, in Ireland now number 93, including ten auxiliaries or branches, with a total shareholding membership of 8,750. The quantity of butter produced by the societies in 1896 amounted to 2,791 tons, and the average price realised was 95s. 8d. per cwt. The average price paid for milk supplied by the shareholders was 3.55 pence per gallon. Many of the Irish dairy societies also undertake the purchase of farming requisites on behalf of their members.

* Vol. II., No. 1, June, 1895.

TITMICE (*Paridæ*).

THE CRESTED TITMOUSE - -	*Parus cristatus.*
THE COAL-TITMOUSE - - -	*Parus ater.*
THE MARSH-TITMOUSE - - -	*Parus palustris.*
THE GREAT TITMOUSE - - -	*Parus major.*
THE BLUE TITMOUSE - - -	*Parus cæruleus.*
THE LONG-TAILED TITMOUSE* -	*Parus caudatus.*

All the titmice are more or less active hunters of insects, for which they are constantly on the watch, and no inhabitants of the insect world come amiss to them as food. They are especially useful in the destruction of many crop pests, which they devour in all stages. During the winter they clear off enormous quantities of eggs which have been deposited by insects of various kinds in dormant buds, or near the buds, and in the clefts of the bark or rind of trees. At this season the titmice may be seen frequently running up and down the trunks, stems, and branches, or hanging head downwards from the smaller branches and twigs, prying anxiously into each crevice and fold of the rind, in search of eggs, hibernating larvæ, or perfect insects. Their sight is so keen that they can detect such small eggs as those of the winter moth, and they have been seen actively devouring the minute red eggs of the *Bryobia* upon the stems and branches of gooseberry bushes and damson trees.

It is sometimes alleged that the tits, like the sparrows, pick out the buds of trees and shrubs, either wantonly or for food, but this accusation is wrong and based upon insufficient investigation of the circumstances, as titmice attack only buds that are infested, for example, apple, pear, plum, and damson buds infested with the larvæ of the winter moth, or the larvæ of the apple blossom weevil.

*Some naturalists have placed this bird in a separate genus—*Acredula*; others keep it in the genus *Parus*.

The crested tit, *Parus cristatus*, is a pretty little bird, but it is scarce and decreasing in numbers. It feeds upon insects and weed seeds, and should for this reason be carefully preserved. Yarrell, Seebohm, and Harting remark upon the rarity of this bird.

The coal-tit, *Parus ater*, though somewhat common, is not so well known as the great tit and the blue tit, since it is not domesticated and lives in woods, copses, and shrubberies distant from houses. It is frequently found in birch and pine woods. "Birch woods," says Seebohm, "are the favourite haunts of this bird during the breeding season, where the abundance of holes suitable for nesting purposes is probably the chief attraction."

The coal-tit is as great a destroyer of insects as the other members of the same family, and should be vigorously preserved. Yarrell, in writing of this bird, says that like the blue tit it is constantly in motion, roving from tree to tree in active search for those small insects and the seeds of various evergreens upon which it principally exists.

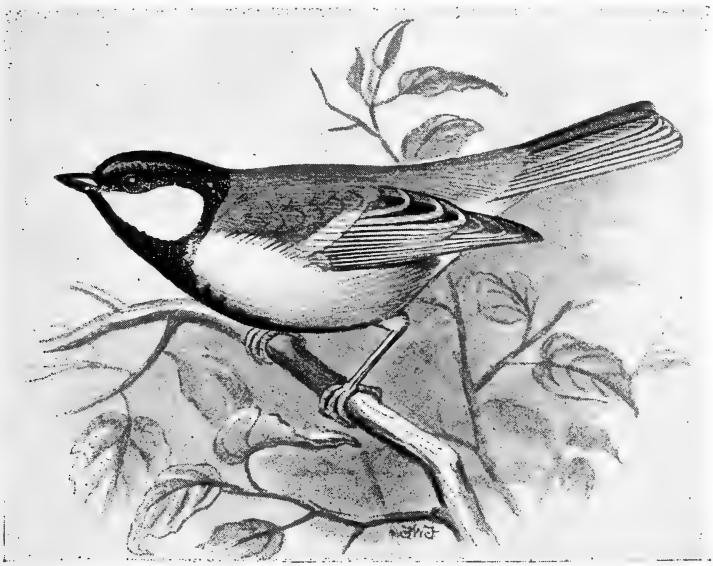
The coal-tit is rather more than four inches long. Its general colour is bluish grey, with a dull white breast, and it may be distinguished from the marsh tit, which it somewhat resembles in colour and size, by a large white patch on the back of the neck and by white spots on the wings. It usually makes its nest in holes in trees and stumps of trees; but Lord Lilford says that he has always found the nests in burrows and holes in the earth made by rabbits and other animals.

The marsh-tit (*Parus palustris*) is not so common as the species just described, and is of rather smaller size. It is occasionally seen in gardens and orchards, principally in the winter, but its chief habitations are low-lying meadows and damp situations, where it nests in holes in old willow-trees and other trees, pollards, and stumps, very close to the ground. It is insectivorous. Yarrell states that it is also partial to the seeds of the thistle.

According to Seebohm it may be seen in almost every conceivable position searching for insects on the buds at the end of a branch. It is slightly smaller than the coal-tit, its head

is bluish black, the sides of the neck are white, the under part of the body is light brown, while the upper part is olive-brown, of varying shades. It builds its nest much in the same manner as the coal-tit, in holes in stumps of trees and in holes in the earth.

We now come to three species of tits that are undoubtedly useful to agriculture, because they are not only more numerous than the other members of the same family, but they live near human habitations, and are found in every garden and orchard. In this trio the first place may be given to the



THE GREAT TITMOUSE *(Parus major)*.

great tit. The great tit is a voracious devourer of insects of all kinds and in all stages. Yarrell remarks that it is indefatigable in search of food, and, being fearless in disposition, it may be readily observed climbing the trunks of trees, or hanging suspended from the under surfaces of branches while examining every cavity, leaf, or bud that is likely to afford shelter to any of its numerous insect-prey. This description of its habits is corroborated by Seebohm. Late in the autumn, small seeds and fruit form part of its diet, but, according to the last-mentioned authority, its young are fed entirely on small caterpillars and grubs. The French

naturalist, Brocchi, in his *Traité de Zoologie*, says: "Knowing the habits of these birds, it is easy to understand that they should be ranged among the best helpers of agriculturists, who sometimes entice them to frequent orchards and gardens by making artificial nesting-places." Brocchi mentions also that on a certain property where the fruit crop was regularly devastated by insects, tits were attracted by artificial nests distributed in great numbers throughout the orchards, and that after the arrival of these birds the crops were abundant.

The great tit is a beautiful bird about six inches long, and usually builds its nest in holes in walls, trees, decayed posts, and similar places. Its head and throat are glossy black, with a white patch under each eye. Its back is olive, or ashy green, and the body underneath is greenish yellow with a broad stripe of black down its entire length.

Not less beneficial is the long-tailed tit (*Parus caudatus*) which is common in the south and south-western counties of England, but not so common in the north. It is about four-and a-half inches long, and sometimes builds a most elaborate nest, shaped like a bottle, from which this bird is known familiarly in some localities as the "bottle tom-tit;" the nest, which is built in thick bushes or dense shrubs, has a very tiny hole in the upper part of the side, and the eggs vary in number from ten to sixteen. Yarrell holds that this bird is more decidedly insectivorous even than the other species of tits. Seebohm also remarks that its food is chiefly composed of insects, but that it also eats small seeds of various kinds, as of grasses and of the birch. Brocchi maintains that it feeds entirely on insects in France and that it and all the species of tits have a right to the protection of agriculturists, to whom they render important services. He estimates the annual consumption of each of these birds at nearly 200,000 insects in the form of eggs and larvæ, and remarks that when these birds attack the buds of fruit trees, an offence with which they are sometimes charged, it is certain that there are insects within these buds.

The head, breast and neck of the long-tailed tit are whitish, with black bands or stripes. The back is black, and the wings and the very long tail are black edged with white.

The most useful of all the tribe of tits, however, is the blue tit (*Parus cæruleus*), a pretty little bird about four and a-half inches in length and happily distributed generally throughout the country. The wings and tail of this species are blue, the breast and belly sulphur-yellow, the back yellowish-green, and the side of the head white with a blue band running across it from the beak to the nape. Its nest of moss, hair, and feathers is built in holes in trees, walls, or gate posts, and sometimes in pumps, letter boxes, and other extraordinary places. Insects appear to be the principal objects of its search during the summer. Naturalists who have watched these



THE BLUETIT (*Parus cæruleus*).

birds saw nothing but small grubs and caterpillars brought to the young ones from apple trees near. In the winter this tit feeds upon seeds, eggs and pupæ of insects, and anything that it can pick up. The hen bird lays from eight to fourteen eggs.

In a report published by the Massachusetts Board of Agriculture upon that most destructive insect, the gypsy moth, allusion is made to the services of titmice in Europe.

The writer of the report says: "In Europe there are six different species of titmice. All of them are found in some

of the countries where the gypsy moth is native. They are all recognised as eminently beneficial, and are regarded by foresters, entomologists, and ornithologists as among the most useful species in controlling noxious insects. Could they be successfully introduced here they might do a vast amount of good, not only in destroying the eggs of the gypsy moth, but their larvæ also, as well as the eggs of many injurious insects."

In a bad attack of gypsy moth in 1848 in Germany it appears that all the trunks and branches of the trees on a certain estate were covered with the egg clusters of these insects. It was a useless task to attempt to remove them by hand, and the trees were not expected to survive. Towards the winter, however, numbers of titmice and wrens came daily to the trees and the egg clusters disappeared. In the following spring twenty pairs of titmice nested in the place, with the result that the plague was noticeably reduced, and a year later the birds had cleared off the insects to such an extent that the trees had entirely recovered their former vigour.

These useful little birds, the tits, do not appear in the schedule of the Wild Birds Protection Act of 1880. Some species, however, have been added to it in a few counties of England. The eggs of some are also protected under the Act of 1894 in a few counties. In the counties of Northumberland, York (E. Riding), Cambridge, Chester, Norfolk, East Suffolk, Devon, Essex, Kent, Isle of Wight, the eggs of all the species of tits are protected in the specified breeding areas. Both the birds themselves, as well as their eggs, deserve to be preserved.

CHEESE-MAKING IN AMERICAN FACTORIES.*

The first step in the process of making cheese in American factories—viz., the care and handling of the milk, devolves upon the farmers supplying the raw product. After the milking is completed, the milk is immediately taken from the sheds and well aërated either by running it thinly over a flat or fluted surface, or pouring it from one vessel to another in fine streams; this is done in a place where the air is fresh, pure, and odourless, as the object of the aëration is to remove the animal odours from the milk. When delivery to the factory takes place but once a day, the night's milk, after being aërated, is cooled to 70° F. or less; this is necessary to insure the keeping quality of the milk and its arrival at the factory in good condition.

All cans, pails, strainers, and other utensils that come in contact with the milk are thoroughly washed with the aid of some cleanser, such as soap or salt, rinsed with boiling water or exposed to live steam, and placed where they will be thoroughly aired. By this means they are kept sweet and free from taint.

The milk is all delivered at the factory in the morning between five and eight o'clock. The night and morning supplies are usually brought separately, although they sometimes mixed where the quantities are small. The milk is poured into the receiving can, and a small sample is taken to be tested for fat. This sample is placed in a special bottle, one of which is provided for each farmer supplying the factory. A sample of each day's milk is put into the proper bottle every day for ten days or more, and from this composite sample the fat contents are ascertained by the Babcock method. A small amount of corrosive sublimate or other preservative is put in the bottle previous to taking the first sample, to prevent the milk from souring. After

* The Cheese Industry of the State of New York. By B. D. Gilbert, U.S. Department of Agriculture.

sampling the milk is weighed, and then run from the receiving-can through a tin conductor into the storage vats. Each vat ordinarily holds about 500 gallons.

The temperature of the milk is then raised. Between the wooden part of the vat and the tin lining there is an open space, which is filled with water; the water is heated by steam introduced through perforated pipes running in this space along the whole length of the vat, and thus the temperature of the milk is gradually raised. The heating generally begins while the vat is filling, or as soon as it is filled. After the required temperature of 82° F. to 86° F. is reached the heating is stopped.

The next step is to ascertain if the milk is in a condition ripe enough to add the rennet. The usual method of determining this is by means of the rennet test, for which the following specially-prepared apparatus is used, viz., an enamelled cup, graduated on the inside, with a fine hole in the bottom, a pipette of 1 cubic centimetre, and a small bottle graduated on the neck. With the pipette, 1 cubic centimetre of rennet-extract is measured into the bottle, which is then filled with water to the mark on the neck, the pipette being rinsed into the bottle. If the extract used be of standard strength, this will give a uniform solution at all times. The cup is then filled with milk, and placed on the edge of the vat. When enough milk has run from the cup to bring the surface of the milk down to the first mark on the inside, the diluted rennet is quickly added, the whole stirred well, and the cup left undisturbed. As soon as coagulation takes place the milk stops running through the fine hole in the bottom of the cup. The graduation on the inside of the cup shows the amount of milk which has run out, and from this the degree of ripeness to which the milk has attained is judged. The temperature of the milk and the strength of the rennet being always uniform, the variation in the amount of milk running from the cup before coagulation takes place depends solely upon the degree of acidity of the milk.

When the milk is very sweet the ripening process is hastened by using a small quantity of clean sour milk, free from any taint. If this sour milk is thick, it is strained through a

cloth, so that there may be no lumps of coagulated milk put into the vat. The milk should be so ripened that it will take from three and a-half to four hours from the time the rennet is added until the curd is ready to press. The degree of ripeness necessary to accomplish this result is determined by experiment on the part of the maker. When cheese is to be coloured, the colouring extract is put into the milk in the vat and well mixed at least ten minutes before adding the rennet.

When, in the judgment of the operator, the milk is ready, sufficient rennet is added to coagulate the mass in about thirty minutes. The curd being set, it is ready to cut when it will break clean over the finger. The curd is cut lengthwise and crosswise with horizontal and perpendicular knives. These leave the curd in cubes with a side of about one-third of an inch. The degree of fineness into which the curd is to be cut depends on the ripeness of the milk, and is a matter which is determined by the manner in which the moisture is expelled from the curd before the whey is drawn. About an hour and a half usually elapses from the time heat is applied to the vat until the curd is cut. After cutting, the curd is gently agitated to prevent it from settling at the bottom of the vat and matting together. The stirring allows the curd to shrink and expel the whey or a portion of it. The kernel or small cube or lump of curd forms a thin skin or film over its surface, which prevents the fat globules and other cheese constituents from working out into the whey. The stirring of the curd after it is cut is sometimes done by a hand tool called the curd-rake, but a better factory-appliance for this purpose is an automatic curd agitator, which is attached to the vat and worked by steam. After stirring the curd for about ten minutes heat is applied again to the vat through its water jacket, slowly at first, as if heated too quickly the pieces of curd would cook on the outside and thus retain the whey. After a temperature of about 92° F. is attained the curd is heated more rapidly until the required temperature of 97° to 100° F. is reached. This process, which is often called "cooking the curd," usually occupies about one hour.

During the heating process the curd is continually stirred and not allowed to become lumpy or to mat. After the required temperature is reached the curd is still agitated for a few moments. The vat is then covered to assist in keeping the curd at an even temperature until ready to draw the whey. The time occupied from the beginning of the cooking until the whey is drawn varies from two to four hours, averaging two and a half to three hours.

After drawing the whey the curd is stirred somewhat, and thrown up on each side of the vat. The vat is lowered at one end to make an incline to allow the whey to drain away from the curd. As the whey passes off and the curd becomes dry, it becomes matted together ; it is then cut in pieces about 6 inches square, which are piled one above the other at one end of the vat. The curd is now turned as often as once in ten or fifteen minutes, and piled in larger piles as fast as it will allow, until the surplus moisture is expelled. It is then ground and salted, from 2 to $2\frac{3}{4}$ pounds of salt being used to 1,000 pounds of milk. The salt is well stirred in and the curd allowed to lie in the vat, with an occasional stirring, until the salt is all dissolved and the curd feels smooth and silky ; it is then ready to press. There are several kinds of mills for grinding curd. That commonly used consists of two cylinders covered with teeth and revolving toward each other, which pick the curd to pieces. The mill fits across the vat and the curd is ground through it into the vat. The curd when ready for pressing is dipped from the vat with a flat-sided curd-pail and put in the hoops or moulds, an equal amount being measured into each hoop. The hoops are immediately placed in the press and pressure applied.

The pressing of the cheese is done lightly at first, and afterwards the pressure is gradually increased. After about an hour the cheese is taken out of the press and turned over in the hoops. Increased pressure is then applied at intervals until the limit of the press is reached. The cheeses are kept under the pressure for sixteen or eighteen hours, when they are taken out of the mould and placed in the curing room.

ENSILAGE OF POTATOES.

A recent number of the *Bulletin des Séances de la Société Nationale d'Agriculture de France* contains three communications on some experiments made to determine the possibility of storing potatoes in silos. In the first, M. Aimé Girard details the results of experiments undertaken by MM. Vauchez and Marchal with the view of ascertaining whether the heat due to the fermentation of fodder plants in silos could be utilised for cooking and preserving the potato. In these experiments potatoes buried in a silo of crimson clover (*Trifolium incarnatum*) acquired the characteristic colour of that plant, as well as the smell developed by fermentation; the tubers were much flattened by the heavy pressure to which they had been subjected; their cohesion, also, was greatly modified, and it was quite easy to pull them to pieces. The potatoes were examined microscopically and chemically by M. Girard, who ascertained that they had been cooked during the process. Thus, MM. Vauchez and Marchal appear to have demonstrated the practicability of this method of cooking potatoes for fodder. The temperature in a silo of green fodder plants rises to nearly 160° Fahr.; the potato is automatically cooked, and acquires the property of being easily digestible, which is requisite for its consumption by cattle.

That a high temperature (about 160° Fahr.) is necessary is shewn by an experiment carried out by M. Mir, who, in order to determine whether maize, in spite of its size, could be preserved without being cut up, placed large quantities of the entire plant (stalks, leaves, and cobs) into a silo, and enclosed also about a ton of potatoes in the centre. On opening the silo, maize and potatoes were both perfectly good. The tubers were flattened similarly to those in the experi-

ment already mentioned, but they were more cohesive; moreover, the cooking appeared to be less advanced, and upon examination this proved to be the case. The reason of the difference was that the large entire stalks and cobs of the maize necessarily diminished the tight pressure, the temperature was not so high as in the compact mass of clover, and consequently the potatoes were not so well cooked.

Chemical analysis showed that the potatoes put into the clover silo had been less desiccated than in the maize; but the most striking differences were, on the one hand, the quantity of matter rendered soluble by the fermentation of the clover, and, on the other, the high percentage of starch cooked in this silo, consequently rendering the potatoes easily assimilable. It may be noticed also that only mere traces of dextrine and soluble starch were found in the potatoes from the maize silo, while the normal insoluble starch amounted to nearly a third of the whole constituents. M. Girard concludes that the same results would have been obtained in the maize as in the clover under similar conditions of temperature, pressure, and moisture.

These experiments have also led to another important result. It appears that, when taken out of the silo, these crushed potatoes give off their moisture very rapidly after exposure to the air, and are transformed into a hard substance, containing only some 15 to 20 per cent. of water, in which condition they may be kept for a long period. When required for feeding purposes, it is sufficient to soak them in water for a while, which causes them to swell and absorb the moisture until they contain some 60 to 65 per cent. of water, and thus regain their softness and digestibility.

M. Tisserand communicated the results obtained by the ensilage of raw potatoes by M. Courmouls-Houlès. The latter took a mixture of several kinds of raw potatoes, chopped, with the addition of 2 lbs. of agricultural salt per 1000 lbs. of potatoes, and put them into a silo weighted with about 25 cwts. per square yard. The total cost of washing, chopping, putting into silo, and weighing fifty tons of potatoes was £3, or about ¾d. per cwt. The silo, made on

November 20th last, was opened on January 22nd (sixty-two days later). The height of the silo at the time of erection was $5\frac{1}{2}$ feet, and on January 22nd it had sunk to a little over 3 feet. The temperature of the mass was 39° Fahr. at the commencement of the experiment, 42° on December 1st, and 50° on January 22nd. On taking out the potato pulp it was found to have retained its whiteness, but the parts exposed to the air afterwards blackened slightly. Cattle ate this potato pulp greedily, either alone or mixed with undecorticated Egyptian cotton-cake. The experiments are to be continued.

M. Vogué read a third note on experiments made by M. de Monicault, who placed beetroot and potatoes in a silo of fodder-maize. On opening the silo neither beetroot nor potatoes had changed their appearance, although the tubers could be easily divided, as if they had been boiled in water. Analysis showed 4.5 per cent. of sugar in the beetroot. Distillation gave no trace of alcohol. As beetroot contains on an average 12 per cent. of crystallisable sugar it would appear that two-thirds of the sugar had been lost in the ensilage. No soluble starch, dextrine, glucose, or alcohol were found in the potatoes, and ensilage thus appeared to have caused the desiccation of the tuber without having cooked it.

ASSESSMENTS TO LAND TAX.

The Board of Agriculture consider it desirable, in view of the changes consequent upon the passing of the Finance Act, 1896, to give publicity to the following Memorandum, prepared under the authority of the Board of Inland Revenue, directing the attention of owners of land and other persons to the method by which assessments to Land Tax are now made, and to the procedure to be followed in cases where persons who may think themselves over-rated to the tax desire to make an appeal.

Memorandum as to Land Tax in England and Wales.

1. The Land Tax is an apportioned tax. It is not charged at the same rate in the pound over the whole country, but each parish is liable to contribute a fixed annual quota. The parochial quotas were fixed permanently and made perpetual in 1798 by the Act 38 George III. cap. 60, but subject to redemption by the individual taxpayers.

2. The Land Tax quota payable is required by law to be raised in each parish by a new assessment yearly and from year to year at an equal rate on the annual value of all lands and tenements, etc., which have not been exonerated from Land Tax (42 Geo. III. c. 116, s. 180). Such lands and tenements are to be charged "with as much equality and indifference as is possible by a pound rate" (38 Geo. III. c. 5, s. 4).

3. Formerly the maximum rate of Land Tax chargeable was 4s. in the pound (42 Geo. III. c. 116, s. 180). Now, by the provisions of the Finance Act, 1896, s. 31, the amount assessed may not exceed the amount which would be produced by a rate of 1s. in the pound on the "annual value." For the purposes of sec. 31 of that Act "annual value" is

the annual value as assessed under Schedule A in the Income Tax Act 1842, and if an assessment so made on a parish is insufficient to raise the amount of the parish quota the difference has to be written off as irrecoverable.

4. The assessment of the Land Tax rests exclusively with the Land Tax Commissioners for the county.

Any complaint against a Land Tax assessment on the ground of inequality or incorrectness must be by way of appeal to them. Notices as to when appeals will be heard are annually fixed early in the financial year to the church door in each parish. The collectors of Land Tax are required, upon the application of any person who may think himself over-rated, to permit such person, or his proper representative, to inspect the duplicates of assessment at all reasonable times in the day, without payment of fee. Every person intending to appeal is required to give notice of his intention in writing to one or more of the assessors. Appeals once heard and determined by the Commissioners are final.

5. Any person having an estate or interest in lands and tenements (except tenants at rack rent, or holding under the Crown) may contract for the redemption of the Land Tax charged thereon. By the Finance Act, 1896, the consideration for the redemption has been fixed at thirty times the amount of the tax.

6. Information as to redemption may be obtained from the Clerk to the Commissioners of Taxes for the division in which the Land Tax desired to be redeemed is assessed, or (by letter) from the Registrar of Land Tax, Inland Revenue Office, Somerset House, London, W.C.

No fee is payable by a redemptioner for such information.

Copies of this Memorandum can be obtained in leaflet form for distribution on application to the Secretary of the Board of Agriculture, 4, Whitehall Place, S.W.

FERTILISERS AND FEEDING STUFFS REGULATIONS, 1897.

The Board of Agriculture, in pursuance of the provisions of the Fertilisers and Feeding Stuffs Act, 1893, have made and issued the following revised Regulations as to sampling, which are to take effect from the 1st July, 1897, from which date the regulations previously in force are revoked. The revised regulations provide a form for the use of a buyer of a fertiliser or feeding stuff, who may desire to appoint the secretary of an analytical or other association, or some other person, to act as his agent for the purpose of obtaining an analysis under the Act. A form is also provided for the use of a buyer or seller who may desire that the sample should be taken by the District Agricultural Analyst or his authorised representative. The number of bags or packages from which the samples of a fertiliser are to be taken, has been in some cases reduced, and the provisions as to taking samples of feeding cakes have been simplified.

Commencement.

1. These Regulations are to take effect on the First day of July, one thousand eight hundred and ninety-seven, and to remain in force until altered or revoked by the Board of Agriculture.

Definitions.

2. In these Regulations :—

"Authorised representative" means any person authorised by the District Analyst to take samples, with the approval of the body who appointed the District Analyst.

"Buyer" and "seller" include their respective agents.

"Fertiliser" means any article sold for use as a fertiliser of the soil, which has been subjected to any artificial process in the United Kingdom, or imported from abroad.

"Feeding stuff" means any article sold for use as food for cattle, which has been artificially prepared.

Other terms have the same meaning and scope as in the above-mentioned Act.

Appointment of Agent.

3. An appointment of an agent by the buyer may be in the Form A. set forth in the Schedule hereto or in a form to the like effect; and the provisions of these Regulations relating to a buyer shall apply to an agent appointed by the buyer for the purposes of the above-mentioned Act.

Proceedings by Buyer to procure Samples.

4. When the buyer of not less than half a hundredweight of a fertiliser, or of any quantity of a feeding stuff, desires to have the same analysed in pursuance of the fifth section of the above Act, he is, within ten days after the delivery of the article

to him or receipt of the invoice, whichever is later, either to give notice to the seller that he intends to take samples of the article himself, or to give notice in writing to the District Analyst or authorised representative, stating that he desires that the samples shall be taken by the District Analyst or authorised representative, as the case may be.

Regulations as to Samples taken by Buyer.

5. When the buyer intends to take the samples himself, he is to give at least three days' notice in writing of such intention to the seller, with particulars as to the place, day, and hour, of sampling. If the seller does not attend, the samples are to be taken in the presence of a witness, who is to initial each sample.

6. The buyer is forthwith to deliver or send by post to the District Analyst, one of such samples, with the invoice or a copy thereof, and also, in the case of a feeding stuff, any circular or advertisement of the seller descriptive of the article to be analysed, which the buyer may wish the District Analyst to consider in making his analysis and giving his certificate.

7. One of the remaining samples is to be delivered or sent by post to the seller, and the other is to be retained by the buyer.

Regulations as to Samples taken by District Analyst or Authorised Representative.

8. When the buyer or the seller desires that the samples shall be taken by the District Analyst or authorised representative, he is to give notice in writing to that effect to the District Analyst or authorised representative, as the case may be. Such notice is to contain the names and addresses of the buyer and the seller, and such particulars as may be necessary to enable the District Analyst or authorised representative to identify the article to be analysed and may be in the Form B. set forth in the Schedule hereto or in a form to the like effect. A copy of any such notice given by the seller is to be sent at the same time to the buyer.

9. The District Analyst or authorised representative, as the case may be, is to give at least three days' notice in writing to the seller and to the buyer, as to the place, day, and hour, of sampling, to enable them to be present at such sampling, if they so desire.

10. One of the samples taken by the District Analyst or authorised representative is to be retained for the use of the District Analyst in making this analysis, another delivered or sent to the seller, and the third delivered or sent to the buyer.

11. Any notice or sample required by these Regulations to be given or sent by the District Analyst or authorised representative to the buyer or the seller, may be sent by post to the respective names and addresses stated in the notice to be given under Article 8.

12. The District Analyst, or authorised representative, as the case may be, is, at or before the time of sampling, to be supplied by the buyer with the invoice or a copy thereof, and also in the case of a feeding stuff, with any circular or advertisement of the seller descriptive of the article to be analysed, which the buyer may wish the District Analyst to consider in making his analysis and giving his certificate.

13. The District Analyst or authorised representative is to provide any receptacle or other thing required by him for the samples.

General Regulations for taking Samples.

(*a.*) *Fertilisers.*

14. When the fertiliser is delivered in bags or other packages, a number of bags or packages are to be selected as follows, viz. :—

Not less than 2 bags or packages where the quantity does not exceed 1 ton.

" 3 " " " " 2 tons.

" 4 " " " " 3 "

and one additional bag or package for every additional ton or part of a ton; provided that in no case need more than 10 bags or packages be selected.

15. The selected bags or packages are to be emptied separately on a clean and dry stone or wooden floor, worked up with a spade, and one spadeful from each

set aside. The separate spadefuls are then to be thoroughly mixed and any lumps broken up by the hand or spade. From this mixture three samples, each from ½lb. to 1lb. in weight, are to be taken and carefully and securely packed.

16. When the fertiliser is delivered in bulk, then, in like manner, portions are to be taken from different parts of the fertiliser, and thoroughly mixed together, and the samples taken from a portion of such mixture.

17. When the fertiliser consists of bulky material, uneven in character and likely to get matted together, such as shoddy, wool, refuse, hair, &c., portions are to be taken from the selected bags or packages, or from different parts of the fertiliser, if in bulk, the matted portions torn up, and the whole mixed as above directed, but no sample is to be less than 1lb. in weight.

18. As an alternative method, where neither the seller nor the buyer signifies objection thereto, samples of a fertiliser delivered in bags or other packages may be taken by a sampling pale or spear or pipe or tube, which shall not be less than twenty-four inches in length, and two inches in diameter. The total quantity so abstracted for the samples shall be not less than five pounds where the quantity of the fertiliser does not exceed five tons, and not less than ten pounds where the quantity exceeds five tons, and shall be drawn from at least double the number of bags or packages required to be selected under Regulation 14.

(b.) Feeding Stuffs.

19. When the feeding stuff is in the state of meal or grain, it is to be sampled in the same manner as prescribed for fertilisers. When the feeding stuff is in the state of cake, a number of cakes are to be selected as follows :—

Not less than	3	cakes where the quantity does not exceed	1	ton.
,,	5	,, ,, ,,	5	tons.
,,	10	,, ,, exceeds	5	tons.

20. The selected cakes are to be broken into small pieces such as could be passed through a half-inch sieve. These pieces are to be thoroughly mixed, and from the mixture three samples, each not less than 1 lb. in weight, are to be taken.

21. In the case of a feeding stuff, if any appreciable portion be mouldy, sour, or otherwise unsuitable for feeding purposes, or if cakes be full of hard lumps, or have cotton or hair attaching to them, separate samples are to be taken of such portion or cakes and of the residue of the feeding stuff. An estimate is to be formed as to the proportion of the feeding stuff represented by each sample.

22. When the feeding stuff is in a fluid or semi-fluid condition, three packages are to be selected, and a portion taken from each. The several portions are then to be well mixed together in a clean vessel, and three samples taken therefrom as in other cases.

General Directions.

23. In every case the sampling is to be done as quickly as is possible consistently with due care, and the material is not to be allowed to be exposed any longer than is absolutely necessary.

24. The object of the person taking the samples is to obtain samples fairly representing the bulk from which they are drawn, and therefore no bag, package, or cake, is to be selected which has apparently been damaged while in the possession of the buyer.

25. Each sample is to be packed in a dry clean bottle, or jar, or (except in the the case of a fertiliser) in a dry clean tin, or in some other suitable manner, so that the original composition of the fertiliser or feeding stuff may be preserved.

26. The samples are to be so packed and secured that they cannot be tampered with, and are to be sealed and initialed by the person taking the sample. They may also be sealed by the buyer and the seller, if present and so desiring. Each sample is to be marked with the name of the article, the date and the place of the sampling, and with some distinguishing number.

Regulation as to Samples sea'ed by Seller and Buyer.

27. Where any samples are taken in the presence of, and sealed by, the seller as well as the buyer, such samples are to be deemed, as between the buyer and seller, to have been taken in accordance with these Regulations.

Revocation.

28. All Regulations heretofore made by the Board of Agriculture in pursuance of the provisions of the Fertilisers and Feeding Stuffs Act, 1893, are hereby revoked as from the time at which these Regulations take effect.

Short Title.

29. These Regulations may be cited as the Fertilisers and Feeding Stuffs Regulations, 1897.

In witness whereof the Board of Agriculture have hereunto set their Official Seal this First day of June, one thousand eight hundred and ninety-seven.

(L.S.) (Signed) T. H. ELLIOTT.
Secretary.

SCHEDULE.

FORM A.

Appointment by Buyer of Agent for purposes of the Fertilisers and Feeding Stuffs Act, 1893.

I, *A.B.*, of hereby appoint *C.D.*, of *or* the Secretary for the time being of the Association [*or as the case may be*] to do on my behalf all things necessary for the purpose of obtaining an analysis under the Fertilisers and Feeding Stuffs Act, 1893, of the fertiliser *or* feeding stuff bought by me under an invoice, a copy of which is annexed.

FORM B.

Request that the Samples may be taken by District Agricultural Analyst.

To,

[*Here insert name and address of the District Agricultural Analyst.*]

I, *A.B.*, of hereby request that the necessary samples for the purposes of the Fertilisers and Feeding Stuffs Act, 1893, of the under-mentioned fertiliser *or* feeding stuff may be taken by you or by some person duly authorised by you, for which I enclose the prescribed fee of shillings.

Name and Address of Buyer.	*Name and Address of Seller.*	*Description of Fertiliser or Feeding Stuff identifying the Parcel.*	*Place where the Fertiliser or Feeding Stuff can be sampled.*

N.B.—A buyer giving this Notice should send therewith the invoice or a copy thereof, and also, in the case of a feeding stuff, any circular or advertisement of the seller descriptive of the article to be analysed, which the buyer may wish the Analyst to consider in making his analysis and giving his certificate.

A seller giving this Notice is at the same time to send a copy thereof to the buyer.

INJURIOUS INSECTS AND FUNGI.

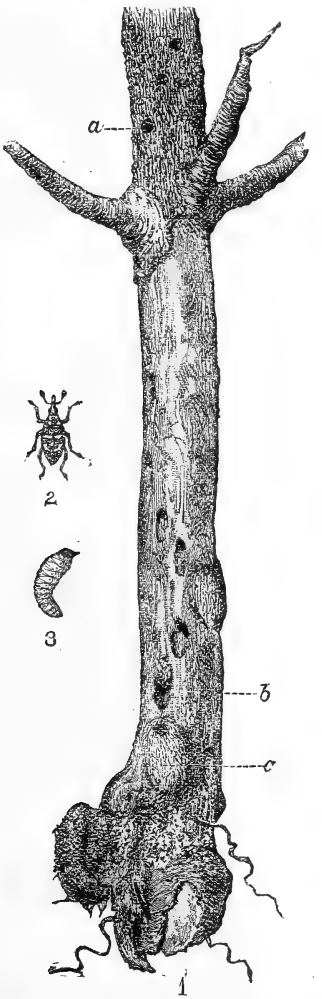
The Branded or Small Brown Fir Beetle (*Pissodes notatus.*)

On the 18th March last the Board of Agriculture received from Ferryside, South Wales, some young Scotch fir trees which showed signs of serious injury. It was stated that the spot from which these affected specimens were taken had been three times planted unsuccessfully; it was situated on a steep bank near the sea, well protected from the wind.

Upon examination of the trees it was found that the bark had been punctured in many places during the preceding summer and autumn, evidently by an insect, and that from these punctures there had been a flow of turpentine which was congealed in white masses. On stripping off the bark there were found under it passages caused, as it seemed, by the larvæ of an insect feeding as it progressed, and at intervals there were oval or elliptical holes like cradles (*b*), in some cases the sixth of an inch deep, reaching to the pith of the young trees. Over these cradles were coverings made of the fibres of the wood bitten off by the larvæ before pupation, which looked as if they were made of chewed string (*c*). In the bark immediately above each of these cradles there was a small hole about the size of a No. 6 shot through which the beetles had escaped (*a*). In a few cases, however, these holes were wanting, and larvæ which had passed the winter in this state were found under the bark.

From the appearance of these holes, the peculiar pupal coverings, and the larvæ, there can be but little doubt that the insect which caused the injury is *Pissodes notatus*. The larvæ, the holes, and the escape holes were too small for those of *Pissodes pini*.

This is by no means a common beetle in this country, but it is very plentiful and extremely destructive in French pine forests, also in Germany, Austria, and Italy. It is not recorded that it is known in the United States, but there is a beetle there, known as *Pissodes stribi*, of somewhat similar



1. Stem of Scotch Fir attacked by *Pissodes notatus*. 2. The beetle. 3 The larva.

habits. Canon Fowler says :—"*Pissodes notatus* is very local, and not common in Great Britain . . . . I have a strong idea that it has been taken in some numbers near Bournemouth, but cannot find any record. It is the only species found in France, where it inhabits the whole basin of the

Seine, so that there would be nothing against its occurrence in such a pine-clad district as Bournemouth."

The beetle is from 3 to $3\frac{1}{2}$ lines in length. Its rostrum is one line long, and the long clubbed antennæ are situated about the middle of the rostrum. The ground colour is red-brown of a rather dull hue, and the body is clothed with white scales. It has small white spots on its thorax, from which it is called by the Germans *Weisspunkt*. Upon the elytra or wing-cases there are two bands of light colour running transversely, varying between white and yellow. The beetles lay eggs on the trees towards the latter part of April, making holes in the bark for this purpose. According to Ratzeburg the eggs are laid at intervals, and singly, and are hatched in from eight to ten days. The eggs are placed upon the stems from the base to about two feet in height; they are also laid upon the cones of firs, as larvæ are frequently found in these. The larva bores through the inner rind and makes passages in it and in the soft wood, biting and living on this. Before pupation it makes the cradle-like hole in the harder wood where pupation takes place.

The ordinary period in which the larvæ work is said by Ratzeburg and Kollar to be during June and July, but in some cases, as in that of the Scotch firs submitted in March last, the larvæ pass the winter under the bark. Taschenberg says that the larvæ occasionally live through the winter, Ratzeburg also gives instances of this, and Professor Sajo in Budapest has stated recently that he has found quantities of larvæ of *Pissodes notatus* in the winter in the bark of *Pinus Austriaca*.*

The larva is whitish, or light in colour, and becomes cream-coloured as it approaches pupation. It is about two lines in length when extended, but it lies generally in a curved position and is much wrinkled. The head is of a chestnut colour and has a few hairs upon it. There are a few hairs also upon the tail end of the body. The mouth has strong jaws, well adapted for biting and for scooping out the cradles for pupation in the hard wood. The pupa is covered, in the

* Ueber Insektenfeinde von Pinus silvestris und Pinus Austriaca; Von Professor Karl Sajo in Budapest.

manner previously described, with fibrous materials forming a kind of cocoon. As a rule pupation lasts through August, and the beetles come forth in September through small holes in the bark. These feed upon the bark of coniferæ until the cold forces them to take shelter in clefts in the roots, just above or just under the ground, also in moss, grass, or litter near the trees, where they remain until spring.

Eggs are frequently laid by the beetles upon the cones of the previous season, and larvæ have been found in quantities in them.

Scotch firs, Austrian firs, Weymouth pines, and occasionally larch, are attacked by *Pissodes notatus*. It is stated that this beetle principally attacks trees already diseased, but it is also certain that in its perfect state the beetle attacks healthy, vigorous trees, which it weakens by continued piercings. This infestation is most dangerous in the case of young fir trees from three to eight years old, before they have strength to resist the attack, which is indicated by the "needles" or leaves at the end of the branches turning red in the spring. It is generally more prevalent upon sandy land and poor soils, probably because the trees are not vigorous and cannot grow away from the attack.

There appear to be no remedial measures to be taken against this insect, but the prevention of its extension may be accomplished by rooting up all infested trees and promptly burning them. June and July would be the best time to do this. The change in the colour of the leaves, or "needles," and the general stunted appearance of the trees, would show which were infested. It is also desirable to clear away from fir plantations all trees that are dying. All fir cones should be collected and burnt.

THE GYPSY MOTH *(Porthetria dispar)* IN MASSACHUSETTS.

A large volume, elaborately illustrated, was published at the end of 1896 under the direction of the State Board of Agriculture of Massachusetts, giving an account of the work of destroying the Gypsy moth (*Porthetria dispar*) in the

"Commonwealth of Massachusetts," and showing how efficacious combined and intelligently directed energy is in checking the spread of insect pests.

The Gypsy moth is a well-known pest in some European countries, where it causes much destruction in woods, forests, orchards, and gardens. It appears to have been unknown in the United States until 1868, when it was introduced by one "Leopold Trouvelot, a French artist, naturalist, and astronomer of note," who imported it in the course of his experiments with silkworms, and upon some of the moths escaping he announced the fact publicly. This took place at Medford, Mass., and within twelve years from the time of its introduction the moth had become a serious nuisance to those living in and near Trouvelot's house. Within twenty years it had spread into thirty townships, and gained a foothold in each without attracting public attention. In 1889 and 1890 the Gypsy moth caterpillars were a terrible pest in various districts, eating off the leaves from all trees in gardens, orchards, shrubberies, and woods. The caterpillars were so thick on the trees that they could be heard eating. They got on fences until they made them quite black. They got into the houses, and were even found in "beds when the blankets were turned down." It is considered that if the State had taken no action in this matter the caterpillars would have increased to such an extent that they would have bred a pestilence in the infested localities; the stench arising from them was nauseating. "The foliage was completely stripped from all the trees, presenting an awful picture of devastation, and promising in a short time to kill every tree and shrub, and all vegetation in any region visited by the creatures, which shows how inadequate individual effort was to cope with the subject." In the report photographs are given of trees in woods and orchards without a vestige of leaf upon them in midsummer.

In 1891 an Act to provide against depredations of the Gypsy moth was passed by the Massachusetts Legislature authorising the State Board of Agriculture to provide and carry into execution all reasonable measures to prevent the spreading, and to secure the extermination, of the Gypsy moth

in the Commonwealth, and giving full powers of action against it.

The State Board formed a committee, by whom inspectors were appointed, with gangs of men under them, in each of the sections, into which the infested district had been divided. The eggs of the moth were first dealt with. Each inspector was instructed to inspect his section and destroy all the eggs found therein. The eggs were cut, or scraped, from the trees with knives, gathered into cans, and burned with oil in small stoves made for the purpose. Rubbish and undergrowth containing eggs were also destroyed by fire. In some places the bark of trees was so covered with egg clusters that it presented a yellowish appearance. From a careful estimate made by the inspectors it was shown that the number of egg-clusters destroyed in the first six weeks of 1891 was 757,760. The number of eggs contained in these clusters would probably be from 300,000,000 to 500,000,000. As the Gypsy moth hibernates in the egg form, it is important that active measures should be taken to destroy the eggs during the winter.

When the caterpillars emerged from the eggs their ascent into the leafy parts of the trees was to some extent prevented by encircling the trunk with some appliance, or substance, as sacking, matting, or cotton-waste, in which the larvæ collected and were subsequently destroyed. (The codlin moth caterpillars can be similarly caught in folds of sacking.) But some of the large caterpillars got over these bands, and it was found more efficacious to put bands of tarred paper round the trees, so that the caterpillars were hindered from going up. The composition used consisted of three parts of "tree ink," one part of pine tar, and one part of residuum petroleum oil. Cotton-waste was put under the paper to prevent the tar (which was put on very thickly, and frequently renewed) from injuring the trees. It was found that unless egg destruction had preceded the banding, the massing caterpillars bridged the tarred paper with their bodies, so that other caterpillars crossed over and went up the trees.

A new material for "tarring" was also used, termed "raupenleim"—literally, "caterpillar glue" used largely in

Germany for banding trees against the "Nun" moth —*Liparis monacha*—which was found superior to tar preparations, "as it remains soft and viscid for several months, and prevents the ascent of nearly all kinds of larvæ and also wingless female imagos." It is stated that this composition is not injurious to the trees. Machines are employed in Germany for putting "raupenleim" on trees, and some of these were imported by the State Board of Agriculture, and used with advantage. Another material called "dendrolene," of American origin, a crude petroleum product, was used also with advantage, as it remains soft for a long while, and, according to Dr. J. B. Smith, Entomologist of the New Jersey Experiment Station, is "a perfect barrier against insects attempting to cross it."

Many experiments were made by spraying infested trees with Paris Green and London Purple; but they do not appear to have been satisfactory. In the first place there was a most determined opposition to spraying on the part of the inhabitants, and in the second the older caterpillars were not materially affected by the poisoned food. Upon the younger caterpillars the effect was better, but "under ordinary conditions spraying with Paris Green for the Gypsy moth was ineffective and unsatisfactory." It is, however, added that further investigation is necessary on this point. Spraying with arsenate of lead gave better results. The most elaborate machines, hose arrangements, and nozzles were used for the spraying experiments, and are described and figured very fully in the volume referred to.

As it was noticed that before the caterpillars had attained half their growth they left in the daytime the leaves upon which they had fed during the night, and clustered together in sheltered places, as holes in trees, some even leaving the trees and retiring under rubbish, stones, and other refuges, to pass the day, traps were devised to catch them. These consisted of pieces of "burlap," or light bagging or sacking, fastened round the trees at about 5ft. from the ground. Strips of this bagging, about 12in. wide, were tied tightly round the tree with twine. The upper part of the bagging was turned over the twine so that it hung like a cloth suspended from a

clothes-line. The edges hung loosely, but the centre was bound securely to the trunk, and the caterpillars crawling down in search of shelter got under the folds, and were killed by the workmen, who crushed them, or, if they were in large quantities, brushed them off into baskets and destroyed them.

Upon the whole, the efforts of the Massachusetts Board of Agriculture were fairly successful. Not only has the spread of the insect been checked, but the region now occupied by the Gypsy moth is much less extensive than that occupied by it when the work was begun. The work of the Board was much restricted by reason of the inadequacy of the grants, or appropriations, made by the Government, as well as by the repeated delays in making the annual appropriations for this purpose. The reporters state that there is no doubt that the Gypsy moth can be held in check, and that it can be exterminated if sufficient resources can be secured, and vigorous measures taken.

The male moth has a wing expanse of from one and a-halt to two inches, and is of a brownish yellow colour. The female is larger and lighter in colour, being of a yellowish white. Though it has ample wings it does not fly, but crawls up trees and shrubs to lay its eggs in clusters, and deposits them also in holes in walls, under stones, on dead leaves, under fence rails, and in other places. The eggs are about the twentieth of an inch in lateral diameter, and of a dark salmon colour when laid, getting darker later on. The eggs remain during the autumn and winter, and have powers of resisting heat and cold in a marvellous manner, until they are hatched in April. They are laid in the summer, and remain until the end of April, when caterpillars begin to appear. The caterpillar is rather more than an inch long when full grown. Its head is dull or yellowish white, and more or less mottled with black or brown over the top or sides. The body is dark brown mottled with yellow, with a yellowish or ochreous dorsal line. There are groups of black spines and yellow hairs on each tubercle, and on the head and lower extremity. The caterpillars remain in this stage from six to seven weeks, and collect in masses to spin cocoons for pupation, which takes place upon trees, under stones, and in many other places. The pupa is reddish

brown, wrinkled, pointed, and three-quarters of an inch long. Pupation lasts about fourteen days. The moth lays eggs in clusters containing from 400 to 500, which are covered with the yellowish hairs of her body, upon trees and in every other conceivable place.

Experiments in changing egg clusters rapidly from a high to a low temperature were conducted, with the following results. In March, 1895, four egg clusters were changed in twenty minutes from a temperature of 80° above zero to 5° above zero, and left all night in a freezing mixture of calcium chloride and snow. Two hatched on April 9th, and two on April 11th. On March 20th, 1895, two egg clusters were exposed to a temperature of 80° F. They were then packed in a mixture of chloride of calcium and snow, reduced in fifteen minutes to a temperature of 20° below zero, a fall of 100°. They were kept in this temperature for thirty minutes. By April 16th all had hatched.

Fortunately there are numerous parasites and predaceous insects which in some circumstances materially check the increase of the Gypsy moth. Among these are hymenopterous insects, especially some species which place their eggs well within the tissues of the skin of the larvæ and pupæ. From these eggs maggots are hatched which feed on, and destroy, their hosts. Certain dipterous insects also destroy larvæ and pupæ in this manner. There are also several species of beetles which devour the caterpillars, notably two species of *Calosoma*. Species of *Hemiptera-Heteroptera*—plant bugs—notably *Podisus serieventris*, are also useful, in destroying the caterpillars, and cages were contrived for breeding and protecting these, as well as the beetles alluded to above.

Birds also are eminently useful in destroying the Gypsy moth in one or more of its forms. Thirty-eight species of birds have been identified in Massachusetts as feeding upon it, although it is believed somewhat generally that birds will not eat hairy caterpillars.

It appears that there are birds in Massachusetts which eat the eggs of insects extensively, like the titmice in Europe, and it is suggested that the habits of European insect-egg-

eating species of birds should be studied with a view to their introduction into the State if this should be found desirable. The protection of birds is advocated, as "it is quite evident that, by pursuing a policy for their protection, the number of birds in the region infested by the Gypsy moth, and their efficacy as insect police, could be greatly increased. Athough the English sparrow (*Passer domesticus*) has been seen to feed on all forms of the Gypsy moth, it appears that this bird in its relations to this insect has been injurious rather than beneficial to man, because as the sparrows multiplied they took by force the bird-houses and cavities formerly occupied by bluebirds, wrens, house swallows, and martins, and as the sparrows further increased, their quarrelsome nature induced them to attack and drive away other birds near their haunts. It was noticed that whenever the sparrow was most plentiful in the infested region, there also the Gypsy moth became most numerous. The caterpillars used the bird boxes as a place of retreat, and the female moths deposited their eggs in the boxes. Sparrows and caterpillars formed a sort of happy family in the bird-houses which swarmed with both birds and insects. . . . The increase of other injurious insects has been noticed wherever the sparrow has become so plentiful as to banish noted birds."

The Gypsy moth is known in Great Britain, and some entomologists have described it as once plentiful in certain fenny districts, but it has gradually become rare. Mr Barrett, one of the leading British lepidopterists, says:— "It is extremely doubtful whether this species is now an actual living inhabitant of these islands."

"CURL" OF PEACH LEAVES.

Exoascus (*Taphrina*) *deformans.*

Peach trees have been most seriously injured this season by the fungus known as *Exoascus* (*Taphrina*) *deformans*, which causes the leaves to curl up into folds, these being in some stages of a reddish colour. In some places this disease

has been widespread and severe, and flowering peaches in shrubberies planted for ornamentation have suffered seriously. The leaves of infected trees dry up and ultimately fall. If fruit is formed, it soon drops when the leaves are much affected, and the whole tree is rendered unhealthy and barren. It has been erroneously thought that this disorder is occasioned by aphides. Aphides are frequently found in the folds of the infected leaves, as they very often infest leaves of many plants and trees that are unhealthy, but on the same tree curled leaves may constantly be seen which have no trace of aphides upon them.

In the first stage of this attack the green skin, or epidermis of the leaf, becomes much thickened and assumes a velvety appearance. The leaf becomes more and more curled and contorted, and is finally of a light red colour, generally upon the edges of the folds or "curls."

If a very thin section is taken from a part of the "curl" and placed under the microscope, the mycelium of the fungus may be seen upon the walls of the leaf tissues. The mycelium has many branches, or ramifications, which finally assume the form of rounded cellules, from which asci are formed containing the spores of the fungus. There are from six to eight spores in each ascus. The spores are nearly globular and colourless. Prillieux says that the spore is able to emit a tube of germination which in favourable circumstances is able to penetrate the cells of the epidermis of the leaf. The fungus is also found on the young shoots of peach trees, and causes a thickening of the part affected. In this way the fungus is, undoubtedly, preserved during the winter, and the spores coming from the shoots in the early spring infest the leaves near them. The spores are borne by the wind from leaf to leaf, and, unless the progress of the fungus is arrested, in the course of two or three years the whole of the peach trees in a garden may become infested. Some trees were noticed last year having several "curled" leaves upon them, and this year these trees are very badly diseased, having 50 per cent. of their leaves distorted. The long-continued cold winds in the latter part of April and

nearly all May checked the growth of the peach foliage and made it unhealthy and liable to this fungoid attack.

Remedies and Methods of Prevention.

In the early stages of this disorder when there are only a few leaves infected, these should be picked off and burnt, in order to prevent the spores of the fungus from spreading over the leaves and shoots of neighbouring peach trees.

Infected trees should be sprayed with bouillie bordelaise, even if the leaves showing infection have been picked off, as the spraying will prevent any spores that may be on the leaves and shoots from germinating. The bouillie should be made with 3lbs. of pale sulphate of copper and 3lbs. of lime to 50 gallons of water. The sulphate of copper must be dissolved in a vessel in cold water, and the lime, which must be pure and fresh, slaked in another vessel. The contents of the two vessels should be poured together into a tub, and the proper quantity of water added. The bouillie should be put on in a fine spray by means of a knapsack machine so that every part of the foliage, shoots, and stems, may be covered with the blue liquid. This mixing and spraying must be supervised and carried out carefully or the foliage may be scorched; but, with a bouillie of the strength given above, there ought to be no injury whatever. In America much stronger solutions are employed without harm. When the foliage gets old the strength of the bouillie may be increased; four pounds of sulphate of copper and a similar quantity of lime may then be used.

AGRICULTURAL AND MISCELLANEOUS NOTES.

Canadian Horses.

The total number of horses in Canada enumerated at the Census of 1891 was 1,470,573, indicating an increase of 411,214 animals during the preceding decade. Horse-breeding in the Dominion has, however, in recent years been largely abandoned, mainly owing to the increase of electric and motor cars.* The effect is becoming apparent in a growing scarcity of horses and unless farmers commence to breed soon there is said to be a prospect of a dearth of good horses within two years. It is, moreover, feared that the most saleable, the young and sound mares and geldings, have been largely disposed of to such an extent that old and unsound horses are mainly to be found on the farms.

Whilst the demand for horses within the Dominion has thus decreased, the export of Canadian horses to the United Kingdom has increased, as the following official figures show. The number of horses imported from the Dominion into this country in 1889 was 119; in 1890, 225; in 1891 1,058; in 1892, 1,745; in 1893, 1815; in 1894, 5,424; in 1895, 12,903; and 11,852 in 1896

In the last annual report on the cattle quarantine service of Quebec and the Maritime Provinces, it is stated by the Chief Inspector that, although the demand for Canadian horses in Great Britain was good, the prices realised did not, owing to a variety of causes, leave a large margin of profit to the exporters.

It is further mentioned that the quality of many of the horses was not of a standard suitable for export; too many cheap inferior horses were bought at low prices, and proved detrimental to the reputation of Canadian horses generally. Good horses, well formed, with good hock and

* Report of the Minister of Agriculture for the Dominion of Canada, 1896.

knee action, 15.2 to 16 hands, weighing from 1,100 to 1,400 pounds, are said to command a ready sale at paying prices for vans and omnibuses, as do also well-formed heavy draught horses, 16 to 17 hands, and weighing from 1,400 to 1,800 pounds, with good feet and heavy bone. High-class saddle horses and large good-stepping carriage horses are, it appears, always in demand.

The Chief Inspector concludes his report with the following interesting observations :—

"It requires but little foresight to realise that first-class horses will during the next few years return to former values. Heavy draught (1,600 pounds and upward) will always bring prices which will pay the breeder. Horses of 1,200 to 1,400 lbs. weight with good action, fit for goods vans, and agricultural horses of compact build, with good feet and action, will always be in demand. High-class carriage and saddle horses pay to breed, and there are yet large numbers of suitable mares in the country which, if served by large, heavy-boned thoroughbred stallions, would produce these classes. In selecting breeding stock give attention to form, size, bone, feet, action and pedigree, and this will be accomplished.

"Too much care cannot be exercised in selecting the sire. The stallion, like the bull, represents half of the herd so far as improvement in blood is concerned; cheap underbred sires should not be used on any account. Breeders should remember that 'like begets like,' and 'as they sow so shall they reap.' Quality establishes value, and if they breed from cheap sires they produce stock which they should not expect to sell dear. It costs as much to feed and care for an inferior animal as one of the first quality.

"Every farming district affords samples of this; one farmer sells his stock for fifties, while his near neighbour sells for tens. This is not due to luck or smartness; it is the inevitable result of carefully-considered cause and effect. Hereditary defects (and most defects of form, colour, temper, and unsoundness are hereditary) should be avoided in both sire and dam. Crooked hocks, in-toed fore legs, curbs, spavins, ringbones, and navicular disease should in all cases condemn either for breeding purposes.

"The care of young horses' feet and the early development of their intelligence require the attention of the breeder, so as to produce a matured animal that will bring the best price in the market. More attention should be given to mouthing, mannering, and educating horses for all purposes. Many valuable horses lose money to the exporter on account of their not being sufficiently broken."

CHICAGO HORSE AND LIVE STOCK MARKET IN 1896.

The horse business in Chicago during the year 1896 was generally unsatisfactory, and something like 80,000 horses were thrown out of employment owing to street car companies having engaged further in the equipment of their lines with electricity. Bicycles likewise continued to interfere with the trade in driving horses, and the general depression in business and low prices of farm products had a very depressing effect on the useful classes known as streeters, light-drivers, and farmers.

During the year about 10,000 horses were consigned to England and Scotland, 4,500 to France, and 3,500 to Germany. Buyers from Belgium, Italy, and Mexico took out upwards of 2,000 head, the number being about equally apportioned. Most of the purchases for these three countries were drivers, with quality, shape, and action, for private sale or use. It is stated by Mr. Consul Vansittart that a large number of the finest coach and carriage horses, trotters with good record, and high steppers, were exported to London and Paris with satisfactory results, some taking blue ribbons at their annual exhibitions, others winning stake-races and obtaining good records.

Of the 105,680 horses received at the Union Stockyards, 97,314 head were exported to eastern, northern, or southern markets, and about 8,360 were taken by customers in Chicago itself and in its neighbourhood. The receipts show a falling-off of 7,633 head, and exports decreased by 11,832 head, as compared with 1895. It may be said that breeding is almost at a standstill throughout the west, there being only about $7\frac{1}{2}$ to 10 per cent. as many colts raised as in 1892-93.

The prices during the last half of 1896 were about £20 12s. 6d. per car of twenty horses lower than in 1895 on common and medium grades. Good horses averaged very favourably with the prices of 1894-95. Horses perfectly mannered, of good style and action, colour, size, and soundness, command good prices, and will sell on the Chicago market for as much as £371, and teams as high as £515 to £618 both at auctions and private sales.

In point of volume the aggregate receipts of live stock in Chicago in 1896 were not the largest in the history of the trade, but were large enough to be highly satisfactory to both exporters and producers, when all the circumstances are taken into consideration. The supply amounted to 2,600,000 cattle, 7,700,000 hogs, and 3,600,000 sheep, which, compared with 1895, shows a gain of 12,000 cattle, a loss of 185,000 hogs, and a gain of 200,000 sheep. Prices, however, were not altogether satisfactory. The demand was not up to expectations, hard times having thrown many persons out of employment, and so lessening the general consumption of meats. When the year opened native beef cattle sold at 12s. 11¾d. to 18s. 11½d. per 100 lbs. The range at the close was 14s. 5d. to £1 2s. 8d.

In the export line business was good. In the course of the year 243,000 cattle were exported abroad alive. The average weight of cattle for the year was 1,118 lbs., the heaviest on record. The supply of Texas and Western Range cattle decreased nearly 200,000. The quality of Texas cattle was better, while Western rangers were poorer than in 1895. The average price of native cows and heifers was 10s. 11¼d. per 100 lbs. or 10d. lower than the previous year.

The year 1896 will be recorded as being the lowest for hog prices since 1879. This was not brought about by excessive supplies, but by a lack of demand on the part of the packers. The stringency of the money market was the principal cause. Hog cholera had much to do with the lessening of receipts. The year opened with sales at 14s. 0½d. to 15s. 3½d. per 100 lbs., and reached 16s. 1d. to 17s 9d., but declined on August 1, to a low point, viz., 10s. 6d. to 14s. The average weight of hogs was 246 lbs., the

second heaviest since 1883. Receipts of hogs at Chicago for 1896 were the fourth largest on record, being 1,640,000 larger than in 1893, but over 900,000 smaller than the receipts of 1891, when 8,600,800 arrived.

The receipts of sheep were the largest known; almost without interruption there has been a steady increase in the supply of sheep for 20 years. Formerly they were raised chiefly for wool, but now the demand for mutton is as pronounced as for beef or pork. This has caused not only an increase in supply, but also a better quality, and more well-bred sheep were noticed than before. Prices ruled low for inferior grades, and high for the best. Early in the year sheep sold at 6s. 2¼d. to 16s. 6d. per 100 lbs., and lambs 10s. 4d. to £1 0s. 7½d. The highest price was paid in June when sheep sold at 18s. 11¾d., and lambs up to £1 7s. 3¼d. The weight of sheep and lambs averaged 88 lbs., against 90 lbs. in 1895.

(*Foreign Office Report, Annual Series, No.* 1853. *Price* 4½d.)

PROGRESS OF DAIRYING IN SWEDEN.

From a report* recently issued by Professor Liljhagen, State Instructor in Dairying, it appears that between 1891 and 1895 the number of dairies in Sweden engaged in the production of milk and butter increased from 1,562 to 1,793. The number enumerated in the latter year included 952 estate dairies, of which 624 used only the milk produced on the estate, while 328 also employed purchased milk; 302 dairies owned by co-operative associations of farmers; and 529 commercial dairies, run by joint-stock companies, drawing their supplies of milk from farms in the neighbourhood. It is noteworthy that there has been a remarkable extension of co-operative dairying in the period referred to in the report, the number of establishments worked on this system having risen from 73 in 1891 to 302 in 1895. On the other

* Några meddelanden rörande den Svenska Mejerihandlerin_en af Gustaf Liljhagen.

hand, the number of estate and commercial dairies has remained stationary.

The quantity of butter produced in the dairies in 1895 was estimated at 54,000,000 lb., as compared with a production of 35,000,000 lb. in 1891. The exports of this article from Sweden in the former year amounted to 53,000,000 lb., and there was an importation in to the country of 1,400,000 lb.

GERMAN TRADE IN DAIRY PRODUCE.

The figures of the trade of Germany in butter, cheese, and milk for 1896 and the preceding year are given in the following table:—

	IMPORTS.		EXPORTS.	
	1896.	1895.	1896.	1895.
	Cwts.	Cwts.	Cwts.	Cwts.
Butter - -	150,929	135,577	136,646	130,996
Cheese - -	200,639	183,961	36,209	43,517
Milk, fresh -	199,779	315,432	81,347	96,931
,, condensed	30	49	50,389	55,436

It thus appears that during 1896 the imports of butter and cheese increased, but there was a large falling-off in milk. The exports of cheese and milk declined, and butter showed a slight increase.

As regards butter, the imports are, at present, greater in quantity than the exports. It is stated that in 1889 the excess of imports was in round numbers 59,000 cwts.; in 1890, 39,000 cwts. From 1889 to 1895 the imports slowly but steadily declined, the total fall amounting to some 49,000 cwts., and not until 1896 is an increase shown. This increase is attributed partly to receipts from North America, whence Germany derived 17,719 cwts. in 1896, against 7,379 in 1895. The imports in 1896 came chiefly from Russia (41,563 cwts.), Austria-Hungary (62,304 cwts.), and Holland (20,399 cwts.). Although the exports show a slight increase in 1896, they are still below the figures for the years 1891-4. Of

the 136,642 cwts. sent out of the country in 1896, by far the largest portion (109,557 cwts.) went to England, while Denmark took 20,271 cwts. It is stated that although the total imports of butter into Great Britain have about doubled during the last decade, the shipments from Germany to this country have declined, and this is attributed by the *Molkerei Zeitung* to American and Australian competition.

The German imports of cheese in 1896 are stated to have been the highest ever recorded, the increase coming almost entirely from Holland, which country would appear to have steadily augmented its exports to Germany since 1893. The imports of Swiss cheese have shown a tendency rather towards a decline of late years, a fact attributed to an improvement in the home production. It is stated that considerable efforts have been made during the last decade to promote the manufacture of Swiss cheeses in Germany.

SOUTH AUSTRALIAN DAIRY PRODUCTS.

The latest officially-published information relating to dairying in South Australia indicates that the number of dairies, with creameries attached, in the colony exceeds fifty, the increase to this number having been very rapid. The quantity of butter exported to Europe during the season 1895-96 did not, however, come up to expectations, partly owing to an unfavourable rainfall and partly to the diversion to New South Wales of a considerable portion of the quantity available for exportation. For instance—350 tons were sent to Europe, 162 tons to New South Wales, and 83 tons to Western Australia; or a total quantity of nearly 600 tons, valued at more than £57,000 on board ship at Adelaide.

The manager of the Produce Exports Branch of the South Australian Department of Agriculture does not look with favour upon these exports to neighbouring colonies, New South Wales in particular: and while not altogether deprecating the practice of taking advantage of such markets, he points out that the apparent advantage is not a real gain, inasmuch as the more permanent markets are thereby tem-

porarily neglected. Moreover, the trade connections which have been obtained after considerable trouble and expense are injured if supplies are irregular, to the detriment primarily of the importers and ultimately to that of the producers themselves. It also appears that the prices obtained in the English market are generally as good, or even better, than those realised in the colonies.

No bonus is now given by the South Australian Government for butter exported, but the system of branding that butter only which is considered suitable for export and creditable to the colony is still continued.

LOMBARDY CHEESE.

Rather severe regulations have lately been issued by the authorities at Venice to prevent the adulteration of the chief articles of consumption, but whether such regulations are of difficult application, or whether they are not rigorously enforced, Mr. de Zanato, British Consul at that city, states that common food and drink—especially milk, butter, cheese, liquors, and wine—continue to be sold in a sophisticated condition. The "Parmigiano," or Lombardy cheese, which formerly had a great reputation, and was largely exported, is said not to enjoy at present the same demand abroad as it did some years ago, owing to some of the cheese-makers turning out low-grade qualities. Some merchants, however, continue to make excellent cheese, but owing to the competition of the adulterated qualities the former cannot easily be procured, as the various brands cannot be trusted, and the appearance of the latter is so excellent as to make it difficult to distinguish them from the pure article.

Cheshire cheese is now imported into Lombardy on a very small scale, and an imitation cheese of similar make, but with little consistency, and with a total absence of the aroma of the original Cheshire, appears to be now made on the spot.

(*Foreign Office Report, Annual Series, No.* 1847. *Price* 1½*d.*)

EXPORT OF OSIERS FROM MADEIRA.

In the Report on the trade of Madeira for 1896, Mr. H. Mercer Bell refers to the export of osiers from that island.

The basket-making, which has lately been started in the east end of London, and the considerable quantity of wickerwork which is made in the blind and deaf and dumb institutions throughout the United Kingdom, have caused a fairly large and increasing export trade from Madeira to be done in the "osiers" of which the wickerwork is made.

The osiers grown in Madeira are closely allied to the willow, being botanically classified as "*Salix viminalis.*" They are chiefly grown at the north side of the island, as they thrive to perfection on the wet portions of the land in proximity to the "Ribeiros," or mountain streams, which overflow their banks during the late autumn and winter months.

Owing to the deficient water supply for agricultural purposes, on the south side of the island, the wickerwork industry is entirely confined to the peasant class who live on the slopes of the mountains, where a plentiful supply of water is obtainable—this being a *sine quâ non* to enable the worker to bend the osiers to the required shapes of the many articles which are made in wickerwork.

[*Foreign Office Report, Annual Series, No.* 1871, *Price* 1d.]

THE DAIRY AND POULTRY INDUSTRY IN NORMANDY.

Mr. M. C. Gurney, Her Majesty's Consul at Cherbourg, in his report for the year 1896 on the trade and agriculture of the Consular district of Cherbourg, gives some interesting particulars concerning the growth and present condition of the dairy industry of Normandy. He states that in the year 1861 the port of Cherbourg exported to England, viâ Southampton, about 300 tons of butter, valued to the producer at 9*d.* per lb. This export trade increased very slowly until the Franco-German war, which, by partially closing the Paris market, until then supplied from this district, induced local

dealers and exporters to find in London a larger market, and gadually extend their trade to the principal provincial towns of England. In the year 1869 the export of butter amounted to 1,850 tons, and this increased to nearly 3,000 tons in 1872. From that time the trade rapidly increased, reaching 5,000 tons in 1875; 8,000 tons in 1880; 12,000 tons in 1885; over 14,000 tons during 1890; and a total of 18,000 tons in 1895.

The year 1896 does not show any very great expansion of this trade, the increase not exceeding 250 tons. This may perhaps be attributed to the competition of Denmark and Australia.

The explanation of these rapid strides made by the West Normandy export trade is that they are due to the remarkable and special qualities of the butter produced in a small area surrounding the township of Isigny, near Carentan, on the Paris-Cherbourg main line. The reputation earned by the Isigny mark in Paris, and subsequently in London, was extended to butter obtained from this neighbourhood, the area of supply being gradually extended through the entire "Cotentin," the west of Calvados, and the north of La Manche, viz., north-west Normandy.

Some Brittany butter of good quality is bought-up and blended in the district, and the Consul has also heard of consignments of Australian butter arriving at Cherbourg, destined for the West Normandy blending mills. The reputation of the butter does not appear to have suffered, as great care is taken in the proper selection, blending, and packing, so as to ensure uniformity of flavour, colour, and unlimited supply.

The district enjoys considerable facilities for the despatch of dairy produce to England. The carrying trade for dairy and farm produce is principally in the hands of the London and South-Western Railway Company's steamers, which sail five times a week from Cherbourg for Southampton at 11.30 p.m. The Western Railway Company of France sends the so-called "butter-train" down to the London and South-Western Railway wharf towards 5 p.m. This train collects the butter, eggs, and poultry at Valognes, Carentan, Isigny,

and other stations, all on the Cherbourg and Paris main line, agricultural produce being carried at reduced rates on a sliding scale, varying according to distance: 14 c. ($1\frac{1}{2}d.$) per ton per kilom. (0·62 mile) for less than 50 kiloms.; 12 c. ($1\frac{1}{4}d.$) for distances of 51 to 100 kiloms.; 10 c. ($1d.$) for distances varying from 101 and 150, and so on. Reduced rates are also granted by the London and South-Western Railway Company for the carriage in bulk to London, viz., 16*s.* 8*d.* per ton from Cherbourg. All the charges of conveyance and loading are proportionately divided between the several exporters, and debited to them by the local agent of the London and South-Western Railway Company. This arrangement has attracted much trade to Cherbourg in the matter of dairy and market-garden produce.

The produce of local market-gardens and poultry-farms is brought to the wharf in carts before nightfall, the vegetable produce being gathered and the poultry killed and prepared during the day.

The Isigny district owes its reputation to the soil, but the land in the neighbouring area is not of the best for butter. As the result, Isigny butter fetches as much as 2*s.* 2*d.* per lb. in the Paris market, while for ordinary Normandy butter not more than about 1*s.* 6*d.* can be obtained.

The farms (in the dairying localities) consist mainly of permanent pasture, and the cows are at grass almost all the year round. The local breed of cattle is the Cotentin, which has been kept pure for at least a century. It is of good size, but does not fatten easily, although the meat fetches a high price. The cows yield a fair quantity of milk (from 2 to 4 gallons per day), but the quality is inferior to that of Jerseys. About $2\frac{1}{3}$ gallons are required to produce 1 lb. of butter.

Poultry rearing is another important and growing industry in this district. The expense of collecting eggs and poultry at the local fairs and markets, often even at the farms themselves, is not large, as the dealer's cart goes on its weekly round. The cost of food in skimmed milk and barley meal is not great, the plant and machinery is a trifle, and manual labour is not a considerable item. With the simple device of a

circular fattening pen of several tiers, on a central pivot, and an automatic crammer, a woman's work in a day at a daily wage of 1s. 3d. goes a long way.

The Consul also quotes the opinions of English firms as to the advantages the latter find in placing their orders in Normandy rather than in England or Ireland. A serious inconvenience is said to be the impossibility of securing a large supply of poultry of uniform weight at home. From Normandy a North-of-England poultry-dealer can obtain 5,000 head of geese of, say, from 10 to 12 lbs. weight for delivery on a given date, whereas it would tax the efforts of a buyer to obtain 500 such birds from one district in Ireland, and would put up the market price for the particular weight. This applies particularly to the Christmas market. Uniformity of weight is also secured in foreign consignments, while it is stated that if 200 turkeys were ordered from a single man in Ireland, the weight would vary from 6 to 16 lbs. The French birds are further slaughtered after twenty-four hours' fasting, packed in clean crates (returnable), made by the packers themselves at a cost of about 10d. a crate, and reach the markets in perfect condition.

The down and feathers, if properly plucked, fetch a good price, feather beds being in general demand.

Eggs are packed in long low cases, easy to handle, and each holding sixty dozen. Large consignments also go from Brittany, in which province, according to the report of Mr. Henniker-Major, Vice-Consul at St. Malo, there is no scientific poultry-farming. The Breton peasant is not a consumer of eggs, and he simply keeps them to await, in remote districts, the passing of the egg-collector, who sells to the local merchant, and they ultimately find their way to St. Malo.

It is observed that the land-system in France, the small holdings in Normandy, the almost total abandonment of cereals in favour of dairy farming in La Manche, are favourable to the rearing of poultry, which are, moreover, allowed a free run in the cider-apple orchards and pasture-lands, and have no foxes to fear.

Vegetables and fruit also form an important export from

north-western France, considerable progress having been made in the trade in potatoes and cauliflowers especially.

The quantities of agricultural produce exported from the ports of Cherbourg, Granville, Barfleur, and St. Malo during 1896 are given as follows:—Butter, 20,311 tons; eggs, 8,830 tons; fowls, 267 tons; potatoes, 25,873 tons; vegetables, 3,406 tons; fruit, 2,019 tons; chestnuts, 3,614 tons; mistletoe, 157 tons. Over 9,000 gallons of cider were also exported from the ports of Cherbourg, Carteret, and Portbail.

[*Foreign Office Report, Annual Series, No.* 1,855. *Price* 2½*d.*]

BUTTER-BLENDING IN NORMANDY.

Mr. M. C. Gurney, Her Majesty's Consul at Cherbourg, has furnished the Foreign Office with an account of the processes in operation at the Normandy butter-blending mills. He says that some dairies are now using small hand-blenders, but in La Manche the competition is sufficient to make any greater care and outlay unnecessary if the butter is sold to the blenders. The farmers rather prefer to add to the weight by not cleaning too much. It is certain, however, that the best made butter fetches the best price, and so easily do farmers win a reputation, that they are known to the agent of the blending mills, and their butter is taken at once even without inquiry. These agents get to know their business thoroughly; their knowledge of butter enables them to select often only by smelling, tasting not being necessary.

The mill where the butter is blended is kept scrupulously clean; it is lighted by electricity, and heated when necessary by hot water. The flooring is of cement and tiles. Hot-water boilers, annexed to the mill, do the cleaning and rinsing and washing of cloths.

Arriving at the mill in cloth-lined hampers, the butter is lifted out of the hampers in the linen cloths, turned out on to glass-covered moving tables, and flattened out. Several layers of varying colour and quality are placed over the first to a given height, the whole mass is then cut vertically upwards into squares of given size by drawing

upwards pieces of twine, previously placed at stated intervals across the table.

The tables with glass tops rest on three small wheels having gutta-percha tyres. They carry the butter to the horizontal blender. This is a circular, concave, revolving table of beech wood, mounted on iron. The revolving roller of corrugated beech wood tapers towards the centre of the table to which it is attached, and where the butter-milk and water run off. Water is let on to the roller in a spray, and the butter is very thoroughly washed.

A hand-blender for small dairies to work 4½ lbs. of butter, 2 feet 4 inches in diameter, costs 2*l.* 3*s.* 6*d.* A hand or motor-power blender for small mills, to work 22 lbs. of butter at a time, with a table 3 feet in diameter, costs 7*l.* 12*s.* Powerful blenders, capable of working 440 lbs. of butter per hour, motor-power, 4 feet 6 inches in diameter, 40*l.* The horizontal blenders, now in use at Valognes, where 60 tons of butter are turned out per day, can manipulate over 2 tons of butter per hour, with 3 to 4 horse-power motor; their diameter is 8 feet 8 inches, with two rollers, and they cost 180*l.* The butter is turned over automatically. These horizontal blenders are sufficient to mix and wash soft and first-class butter.

At Valognes vertical blenders are also in use, the butter being carried to them from the horizontal blenders on the rolling tables. These vertical blenders are necessary for colouring when all the butter is light in colour, owing to drought or frost spoiling the pastures. They are indispensable when margarine is added; they mix better than the horizontal blender, and complete the extraction of butter-milk, but they would not suffice for the latter purpose. The vertical blender consists ot a wooden screw, revolving within a vertical wooden cylinder. The butter is thrown in on top and comes out below, at one side on to a wooden tray.

From the tray of the vertical blender the butter passes on to the roller table, and is carried to the "lisseuse," which is practically a mangle. The "lisseuse," or mangle, consists of two horizontal revolving cylinders of beech wood, between which the butter is rolled, and falls into troughs on wheels having gutta-percha tyres.

Vertical blenders for small mills working by motor power 220 lbs. of butter per hour, cost 8*l.*: 660 lbs. per hour 17*l.* 12s. Those in use at Valognes can work 2½ tons per hour, and cost 60*l.* each. The mangle for small mills working 220 lbs. of butter per hour costs 17*l.* The machines in use at Valognes work nearly 2 tons per hour, and cost 140*l.*

These last-named blenders are useful in dealing with hard butter, which often contains small nodules of greater consistency than the rest. Those remaining in the butter untouched through the first two blenders would, by fermentation, cause marbling of the butter around them, of course depreciating its value. The rollers by squeezing the butter flat remove this defect.

Several sizes are made between those given above in the three kinds of blending machines.

Lastly, the butter is rolled to the moulding machine, which cuts it into cubes of equal weight and size. The machines in use for hand power cost 1*l.* 12s. Those worked by motor power, capable of turning out 300 cubes of half a kilo (1·1 lb.) per hour, cost 7*l.* 12s.

The wrapping in paper bearing the "Isigny" mark, and packing in wood boxes containing 20 cubes of half a kilo. complete the process.

The glass-covered tables on wheels are very convenient, and they wash easily. They cost 5*l.* 3s. 6d. Hot water boilers for 150 quarts are sold at 7*l.* 3s. 6d. Trucks with gutta-percha tyred wheels cost 2*l.* 8s. The Normandy barrel-churns for hand power vary in price from 2*l.* 3s. 6d. to make 2·2 lbs. of butter, up to 10*l.* to make 120 lbs. of butter.

Motor-power churns working 50 quarts of cream cost 9*l.* The prices vary in progression up to 24*l.* for churns, all complete, capable of working 400 quarts of cream at a time.

The creameries and butter factories started in La Manche do not appear to have worked as well as was expected. The experience of the Cherbourg factory has been most unsatisfactory, the loss for last year reaching 1,000*l.* The cost of plant and of working,

although the establishment owns excellent water power, is too heavy to bear the strain of a fall in prices.

[*Foreign Office Report, Annual Series, No.* 1,855. *Price* 2½*d.*]

EFFECT OF WILD GARLIC ON MILK.

The wild garlic (*Allium vineale*) is a weed which, though not frequent, is found in pastures and waste dry places throughout Britain from the Clyde and Aberdeen southward. Its distribution appears to be general throughout Europe, excluding Greece, and it is also found in the Canaries. Although the plant was not originally a native of North America, it is a most injurious weed in the Mid-Atlantic States at the present time. The consequences of the presence of this herb in dairy districts is of such importance that the United States Department of Agriculture has recently issued information on the subject, and pointed out that the milk of cows eating wild garlic in the pasture has the strong, unwholesome flavour of garlic, and any food containing the garlic-flavoured milk is unpalatable. Cream rising from the milk has the flavour apparently intensified, butter made from the cream is worthless, the skimmed milk, clabber, and smearcase, or cottage cheese, are also spoiled. Garlic-flavoured milk cannot be used for making standard cheese—in fact, there is no way of disposing of it except feeding it to stock, and selling it to the few people who do not object to the flavour.

The following information has been issued as regards deodorising milk, and avoiding the injurious effects of garlic upon dairy products:—

Many efforts have been made to avoid the tainting of dairy products by wild garlic, or to remove or disguise the odour. In some localities small pieces of saltpetre (nitrate of potassium) are placed in the pail during milking. While saltpetre does not produce any immediate harmful effects when thus diluted and taken in small quantities, its continued use is very likely to result in injury.

Simple aeration by pouring the milk from pail to pail while it is still warm from the cow improves it to some

extent, and in large dairies different styles of aerating machines are used with good results. Pasteurising milk in open vessels at a temperature of about 155° F. will remove the garlic flavour to a considerable extent, but experiments have shown that when heat alone is used it is necessary to boil the milk for some time to get rid of the odour. Experiments conducted in a Virginia creamery seem to prove that a process combining aeration and pasteurisation is the most successful. This treatment has the advantage of using no chemicals, and the operation is simple. Another method, recently described in a prominent dairy paper, consists in washing the cream with double its bulk of water, in which a little saltpetre has been dissolved, raising the temperature sufficiently to pasteurise the cream, and then immediately passing it through a centrifugal separator. By this process the cream loses much of its weed flavour, but as it has been pasteurised, it must have a ferment or "starter" added to it to insure proper ripening.

It is difficult to remove all of the garlic flavour from milk, and dairymen generally agree that to have the milk entirely free from it the cows must be kept away from places where the weed is abundant. In addition, the stables and dairy-room where milk is to stand must be kept free from garlic odour, which, like many other odours, is readily absorbed by milk. Garlic is more penetrating and persistent (if these terms are applicable in this connection) than most of the vegetable flavours which are given to milk. In many cases these flavours or odours are acquired by the milk after it is drawn from the cow, being taken up fro ne breath and exterior of the body of the cow and the air ot the milking place. Garlic is one of the few exceptions in which the taint is communicated through the structure of the animal itself, but when the milk is first drawn it has this flavour in a very much less degree than is generally appreciated. By far the greater part of the trouble follows the milking, and this can be prevented to a considerable extent by care and judicious management of the cows. If cows, pasturing where there is considerable garlic, are shifted to another field where there is none, and where good water is

obtainable, at least three hours before milking time, so that they come to the milking place with breath and bodies free from taint, the trouble will be reduced to a minimum. If a garlic-free field is not available, the animals may be brought to a stable-yard, and there be fed lightly with hay, a soiling crop, or any long forage, and allowed to stand an hour or two before being put into the milking place.

Keeping the cows in the sheds in the spring and autumn and feeding them on hay, or cutting the garlic plants by hand, or scattering salt upon them and turning sheep on to the pasture well in advance of the cows, are said to be among the best ways of avoiding the injurious effects of wild garlic without entirely destroying the plants. But these are only makeshifts. Complete eradication of the garlic plants is the only satisfactory method. This is practicable within the limits of an ordinary farm, and although involving much labour, it is probably cheapest in the end.

AGRICULTURE IN SOUTHERN ITALY.

Mr. E. Neville-Rolfe, Her Majesty's Consul at Naples, in his annual report for the year 1896 on the trade of that town, states that agriculture in Southern Italy, and particularly in the Campagna Felice, in which district Naples is situate, is suffering from depression. Some years ago the importation of foreign wheat brought prices down to such an extent that many landlords transformed their cornfields into vineyards; but soon after this change the commercial treaty between Italy and France, which enabled the Italian farmer to sell his wines in the latter country at a fair profit, came to an end, and the landlords were left without a market for their produce. The difficulties of farmers have been increased by the objection of the peasantry to any changes in their primitive method of cultivation, and also to their neglect to use sulphate of copper as a remedy for the *Peronospora*, which has made fatal progress, as has the *Phylloxera* in some districts. The productive qualities of the land are further stated to have diminished, owing to crops such as hemp and maize being constantly taken off it

without the application of sufficient manure to compensate for the exhaustion of the soil. Disafforestation has diminished the rainfall, and has also prevented the protection of birds, which are destroyed wholesale, the consequence being the presence of an abnormal quantity of insects.

Several schools of agriculture are situate in the district, the most important being that at Portici, which has been in existence for some twenty-four years, and which is practically an agricultural university. The head of this school has lately issued a pamphlet on the export of fruit to Great Britain, from which it appears that, in spite of the supplies from our colonies, the consignments of Italian fruit to the British market have nevertheless increased.

The method of exporting grapes was formerly a very wasteful one, and a new plan has now been devised. Large tanks have been constructed to run on the railway lines. These wait at the sidings during the season, and the exporter simply brings his grapes to the station, turn them into the tank, and sends them off by the first available train to Switzerland or Germany. On arrival at their destination these crushed grapes go straight to the factory, and may be reckoned to produce 70 per cent. of wine at their first pressing, apart from the by-products. Of these, tartaric acid is the principal, but the grape-stones are said to make excellent chicken food, while the stalks and skins when burnt to ashes form very good ley for washing purposes. The total export of crushed grapes amounted last year to about 8,000,000 tons.

Allusion is made to the recent discovery in Germany of the possibility of making artificial wine (especially port) from malting barley by the introduction of the bacilli of port wine into the mead. These bacilli transform the immature beer into port, and, when they have done their work, can be sterilised, a sufficient stock of microbes being preserved in the laboratory for further use.

[*Foreign Office Report, Annual Series, No.* 1,868. *Price* 1½*d.*

PRODUCTION OF WHEAT IN BUENOS AYRES IN 1895-96.

The Minister of Public Works in La Plata has recently published a report on the agriculture of the province of Buenos Ayres, embracing the harvest of 1895-96. According to this report the area under wheat in that year in the province of Buenos Ayres was 971,197 acres, against 980,138 acres in the previous year. The decrease in 1896 is attributed to the large dimensions of the maize crop. The area under wheat fifteen years ago was only 220,729 acres. The actual yield on the basis of the return of the working of the threshing-machines employed is calculated at 12,781,743 bushels, or an average yield of thirteen bushels per acre. The number of threshing machines in the province was placed at 892, as compared with 327 in 1888.

GRAIN TRADE OF GALVESTON.

The grain trade of Galveston, Texas, which at the end of 1895 was beginning to be of importance, has, says Mr. Consul Nugent, maintained a steady increase, and now bids fair to be a permanent and striking feature of this port.

During the year 1896 the total amount of cereals exported was 9,662,776 bushels, as against 1,233,477 bushels in 1895, or an increase of some 700 per cent. Of this amount 3,440,494 bushels were wheat and 6,222,282 bushels maize.

Now that Galveston appears to have become a permanent exporting point for grain, it has been found that the elevator facilities are insufficient for the business. The present elevators, of which there are two, can accommodate 1,400,000 bushels at a time.

A new elevator, in course of construction, will hold 600,000 bushels, and it is further proposed to enlarge one of the existing elevators, from 400,000 to 700,000 bushels, thus giving Galveston a total storage capacity of 2,300,000 bushels. It is expected that this capacity will be ready for use by July.

Plans have also been proposed for the building of additional elevators by outside companies, but the schemes are not yet fully matured. The indications are that Galveston will

before long become an extremely important grain exporting centre. Its geographical position is all in favour of this, and so far from grain deteriorating whilst in storage there, an argument that was formerly alleged against shipping at the port, it is asserted that grain materially improves there, though exactly why cannot be ascertained.

No less than 126 British vessels loaded full or partial cargoes of grain at Galveston during 1896.

[*Foreign Office Report, Annual Series, No.* 1894. *Price 2d.*]

GRAIN TRADE OF NEW ORLEANS.

In the annual Consular Report for 1896 on the trade of New Orleans, it is stated that this town is now the largest exporter of maize in America, the total shipped in 1896 having been 27,000,000 bushels, or nearly five times as much as in 1895 The business was a new one, and it was only during the year that New Orleans secured those facilities which have enabled it to handle the trade satisfactorily.

There has also been a largely increased exportation of wheat from the port, the quantity shipped in 1896 (to the end of November) being 3,649,000 bushels, as compared with 739,000 bushels in 1895. This cereal, however, is grown at a greater distance from New Orleans, and the grain trade may be said to have only started in 1895. The total export of grain in 1896, including 205,000 bushels of oats and some rye, is computed at 31,500,000 bushels, valued at £2,640,000. Of other products, 240,000 barrels of flour were shipped from New Orleans during the first eleven months of 1896, against 88,000 barrels in 1895, and 23,500,000 lbs. of lard, as compared with 673,000 lbs. last season.

From Mobile (Alabama) there was also a largely increased export of maize, viz., 1,537,000 bushels in 1895-6, as against 103,000 bushels in 1894-5.

[*Foreign Office Report, Annual Series, No.* 1869, *Price* 2½*d.*]

HORTICULTURAL LEGISLATION IN NEW ZEALAND.

The Board have received a copy of an Act passed by the New Zealand Legislature to prevent the introduction, and to provide for the eradication, of diseases affecting orchards and gardens. The diseases at present scheduled under this Act are phylloxera, apple-scab (*Fusicladium dendriticum*), and the codlin moth, and the Act provides for the prohibition, inspection and quarantining of plants and other things likely to produce these diseases.

Any place where phylloxera is discovered to exist, or to have existed, may be declared infected, and owners are required to give notice of the disease.

For the prevention of apple-scab and codlin moth, owners of orchards are required to dress all fruit trees during the autumn or winter with a suitable dressing, and persons failing to comply with the provisions of the Act, or of the Regulations, render themselves liable to a penalty of £10.

EXPERIMENTS IN FEEDING SWINE.

Some notice was given in this Journal for March, 1895 (Vol. II., p. 444), of the experiments in feeding swine carried out at the Dairy Institute of Proskau (Silesia) in 1894. These experiments have been continued, and an account of the results obtained during 1895 is given in the *Landwirtschaftliche Jahrbücher* (Vol. XXV., Part III.).

The conclusions which appeared to be deducible from the experiments of 1893-4 were that too much maize was injurious to pigs under six months old; owing to the formation of bone proceeding less rapidly than the development of fat, the bones were unable to sustain the weight of the body, and the limbs became stiff. No evil results followed the feeding with crushed barley. The question thus still remained to be determined whether the maize was in itself injurious to young pigs, or whether it was deleterious only when given in too large quantities. A further point requiring elucidation was the best method of preparing the food, and data were

also required to ascertain the value of fresh whey. Finally with the view of discovering a fattening food containing a higher percentage of albumen, but less nitrogenous than cereal fodder, dried brewers' grains were included in the experiments.

To test these various points, four pairs of pigs (each pair consisting of a boar and a sow) were selected, all eight being born of one sow on the 5th April, 1895, and all being of about the same strength. The experiments commenced on the 20th May, the boars having been cut two days previously. For the first four weeks (until the 16th June) all alike received 5½ lbs. of skim-milk and 6½ ozs. of crushed barley daily in five meals. The second period (17th June to 28th July) marks the transition from barley to maize and brewers' grains. The individual pairs were now fed separately, and in such manner that the amount of barley was diminished, week by week, the crushed maize (or brewers' grains, as the case might be) being correspondingly increased. At the same time potatoes and whey were included in the rations. The amounts given daily to each animal (in five meals) from the 28th July to the 8th September were as follows:—

Pair I.—8·8 lbs.	skim-milk,	1·1 lbs.	scalded crushed	maize,	2¾ lbs. potatoes.
,, II.—8·8 ,,	,,	,,	uncooked ,,	,,	,, ,,
,, III.—8·8 ,,	,,	,,	scalded ,,	,,	8¼ lbs. whey.
,, IV.—4·4 ,,	,,	,,	dried brewers' grains,		5½ ,, potatoes.

At the end of this period the rations were increased, and were given only four times a day; and again at the end of a further six weeks' period a still larger quantity was given, and the number of daily meals was reduced to three. The milk was always given perfectly sweet, and usually mixed with the other food into a mash; the same applies to the whey. The dried brewers' grains were always scalded with a little boiling water, and the potatoes were also boiled. A little phosphate of lime was regularly mixed with the food. The animals were, until the beginning of October, allowed to be in the open for a few hours every day, when the weather permitted, and they were weighed regularly once a week until their slaughter on the 2nd and 3rd December.

The chief conclusions drawn from comparisons of the weights of the animals throughout the whole period, and

from the dead weights at the time of slaughter, were as follows: The feeding with maize had good results. The course of the experiment seemed to show that by gradually and carefully accustoming the animals to moderate rations of this feeding stuff, pigs, even of four months old, can be successfully fattened on maize. It would appear also that rather better results were attained with the uncooked maize than with this cereal in a scalded state. As regards the whey, the results were more uncertain, and the point requires further elucidation. The experiment with brewers' grains was also inconclusive, as the weight of the two animals of the fourth pair differed considerably from each other. The fact, however, that the average dead weight of this pair upon slaughter was noticeably lower (proportionately to the live weight) than that of the first and second pairs, would seem to indicate that the brewers' grains were inferior to the maize and skim-milk.

AGRICULTURAL EDUCATION IN DENMARK.

The French Consular Agent at Nyborg states, in the French *Bulletin du Ministère de l'Agriculture* for March, 1897, that agricultural education in Denmark may be said to owe its origin to Major-General F. F. von Classen, who, towards the end of the last century, bequeathed a considerable sum for the foundation of an agricultural school for young peasants. Such a school was opened in 1800 at Noesgaard (in the Island of Falster), but no work was undertaken at the time owing to lack of pupils. It was re-opened in 1849, and still exists.

The agricultural schools, may, generally speaking, be divided into three classes: (1) schools providing both theoretical and practical instruction; (2) schools offering mainly theoretical with but little practical instruction; and (3) purely theoretical schools.

Of the first type there is but a single example—that of Noesgaard—which commenced work in 1849. This takes about twenty pupils, sons of peasants, and the course of instruction lasts two years. It has a farm of about 400 acres

attached to it. The school receives no support from the State, but the funds left by von Classen, together with the pupils' fees, are sufficient to defray the expenses.

Theoretical schools giving but little practical instruction are more numerous and number about a dozen. These schools generally require that their pupils shall have previously attended a "high school" (*Folkehjoskoler*); and many of these last mentioned also provide a certain amount of instruction in agriculture, and are also indirectly of importance to agricultural education. The great difficulty in Denmark in the way of giving practical instruction at the agricultural schools is the expense of securing the necessary land. If the instruction is to be really useful, the number of pupils must be as small as possible, and the fees must not be high; but the assistance from public funds is not sufficient to enable the schools to obtain more than the bare minimum of land absolutely required to illustrate the theoretical teaching. It appears to be due solely to its endowment that the Noesgaard school has been able to give practical and theoretical instruction combined in due proportion.

There is one school, belonging to the Patriotic Society of the Diocese of Fünen, which provides purely theoretical education. It is situated at Odense, and, although it is the only institution of this nature with no farm at all, it has lately obtained land for the purpose of conducting experiments in manuring.

Apart from the above-mentioned schools, there is also the Royal High School of Veterinary Science and Agriculture at Copenhagen, a State establishment. Its object is to provide higher theoretical instruction, not merely for agriculturists, but also for surveyors, veterinarians, and horticulturists. Students are required to possess some preliminary knowledge of agriculture, and to have passed an examination admitting to the University. Degrees are granted after a final examination.

The only system of giving purely practical instruction is that adopted by the Royal Society of Rural Economy, which has made arrangements with a certain number of large farms throughout the kingdom to take apprentices and

teach them practical farming. The apprentices spend three years on these farms, visiting successively different parts of the country, and residing for a certain period in each. They receive board and lodging and a sum of money from the owner, performing in return the usual work of farm hands.

Other schools, chiefly of the second kind alluded to above, have been working at different times in Denmark, but have eventually ceased to exist. The pecuniary difficulty is usually the main cause of their breaking up, but there appears often to have been great difficulty (generally because the salaries were inadequate) in securing teachers with a good knowledge of agriculture. Sometimes a school would be opened and flourish under a particular director, but upon changing hands it would have to be closed from want of successors sufficiently interested in the work to carry it on properly. The question of the better supply of teachers is, however, said to be engaging the attention of the State, while the men turned out by the Copenhagen High School of Agriculture are becoming available for such posts in greater numbers.

The State contributions now amount to an annual sum of £6,600 for all the superior (*Folkehojskoler*) and agricultural schools together, and the budget of 1896-7 contains a provision for £10,000 in subventions for poorer classes at the same schools. The proportion allocated to strictly agricultural education is thus indeterminate. The Copenhagen Superior School of Agriculture is considered separately, and is allotted £16,300 in the budget of 1896-7. As regards the attendances, some 75,000 men are stated to have attended the superior and agricultural schools between 1844 and 1894, of whom about 11,000 have followed the agricultural schools proper.

THE SUPPLY OF UNDRESSED SHEEPSKINS (1881-1894).

The annual production of sheepskins in the United Kingdom has varied but slightly during recent years. In

1881 the number of sheep returned as slaughtered or died was 10,357,000. In 1882 and 1883 there was a slight decrease, but in 1884 and 1885 the numbers rose to 10,660,000 and 11,795,000. During the years 1886-1889 there was again a downward tendency, but this was followed by a sharp rise, which culminated in a total of 13,883,000 for 1892. In 1894 the number was 11,653,000, showing an increase of 1,296,000 on the return for 1881. The export trade in British sheepskins fluctuated considerably throughout the period in question. A steady decline from 9,125,120 in 1881 to 3,669,368 in 1885 was followed by an equally steady increase to 8,004,674 in 1888, but from this year an opposite movement appears to have set in, and in 1894 the numbers had fallen to 3,497,273.

Turning to the foreign supply we find that while there were 6,475,264 skins imported in 1881 there were no less than 8,165,718 imported in 1882. From 1882-1889 the numbers remained practically stationary, but in the latter year there was a further increase to 11,302,380, as against 8,926,077 in 1888. Since 1889 there has been a steady rise, and in 1894 the import figures amounted to 13,851,508. The trade in skins from France, Germany, and Turkey would appear to have fallen off somewhat, but on the other hand there has been an increased supply from Russia, the United States, Argentine Republic, South Africa, and Australia. In the two latter countries the development of the trade has been most marked, and in 1894 they contributed between them no less than five-sevenths of the total number imported. In 1881 there were 1,123,028 foreign skins re-exported from the United Kingdom. From that year the numbers rose and fell alternately, until in 1888 a steady rise commenced, and a total of 4,589,135 was reached in 1894. It is worthy of note that these fluctuations are very similar to those which took place in the import trade. There is the same increase in 1882 as compared with 1881, the same stagnation during the years 1882-1888, and the same increase during the years 1888-1894.

The price of foreign skins has fallen materially of recent years. In 1881 their average value, lambs and sheep, was

29·75*d.* each. In 1882 they rose to 31·76*d.*, but in 1885 fell back to 29·12*d.* From 1885 up to the present time there has been a steady decrease, and the average price for 1894 is 24·20*d.*, 18 per cent. less than that for 1881. No figures are available by which any accurate estimate can be made of the prices of British skins; but in all probability their value is approximately the same as that of the skins which are imported.

The following table will show what has been the total number available for consumption in the United Kingdom throughout the whole period 1881-1894, and also what proportion the home and foreign supplies bear to one another. In estimating the latter, it has, of course, been necessary to deduct from the gross amount the number of skins exported or re-exported, as the case may be.

	Total number of Undressed Sheepskins available for consumption in the United Kingdom.	Number of ditto British and Irish.	Number of ditto Foreign and Colonial.
1881	6,584,074	1,231,838	5,352,236
1882	8,029,534	665,205	7,364,329
1883	12,439,159	5,391,003	7,048,156
1884	13,661,677	6,401,528	7,260,149
1885	15,375,175	8,125,487	7,249,688
1886	11,616,064	4,467,514	7,148,550
1887	14,426,122	6,445,375	7,980,747
1888	10,776,357	2,785,690	7,990,661
1889	13,644,281	3,955,951	9,688,330
1890	14,310,587	5,043 627	9,266,960
1891	18,345,790	7,804,338	10,541,452
1892	15,933 051	7,719,152	8,213,899
1893	17,127,179	8,129,319	8,997,860
1894	17,398,477	8,156,104	9,242,373

FRENCH MARGARINE LAW.

The French *Journal Officiel* of the 17th April last contains the text of the new law concerning the repression of fraud in the butter trade and in the manufacture of margarine. The chief points of this law are as follows :—

It is forbidden to designate, sell, expose for sale, import, or export, under the name of butter (with or without qualifying

words), any substance not made exclusively from milk or cream, with or without salt or colouring matter.

All alimentary substances other than butter, which present the appearance of butter and are prepared for the same purpose, can only be described as margarine, whatever their origin, source, and composition. Under no circumstances may colouring matter be added to margarine as thus defined.

Manufacturers, warehouse keepers, merchants, and retailers of butter are forbidden to manufacture, or to retain upon their premises or elsewhere, margarine or oleo-margarine, or to allow other persons to manufacture or store it on premises occupied by them. Margarine and oleo-margarine can only be brought on to the markets at places specially designated by the municipal authorities.

The quantity of butter contained in margarine for sale (whether by churning milk or cream with oleo-margarine or by subsequent addition) must not exceed 10 per cent.

Persons desirous of carrying on the manufacture of margarine must notify the local authorities. Margarine factories, warehouses, and shops must bear a notice with the words margarine (or oleo-margarine) factory (or warehouse or shop) in letters at least one foot high.

Margarine factories are subjected to the supervision of inspectors, appointed by the Government, but paid by the establishments at a salary to be fixed by the Council of State. These inspectors are required to supervise the entry and quality of the materials, the manufacture, and the despatch of the margarine. They are to see that all regulations prescribed by Government regarding sanitary matters are strictly observed, and they can prohibit the use of unsound materials or of such as are injurious to health. They can at all times enter any part of the premises.

All packages, boxes, cases, etc., containing margarine must bear the word "margarine" or "oleo-margarine" in clear and indelible type. The constituent parts of the margarine must be shown on labels and in the invoices. In the wholesale business the packages must also show clearly the name and address of the manufacturer. When the

margarine is intended for export, the manufacturer is authorised to substitute the trade mark of the purchaser for his own, conditionally upon this mark bearing the word margarine in clear and indelible characters.

In the retail trade, margarine or oleo-margarine must be delivered in cubes with the word margarine (or oleo-margarine) impressed upon one face, and put into a wrapper also bearing the same designation with the name and address of the seller. If these cubes are retailed, the goods must be delivered in a wrapper with the said inscription. This regulation applies also to margarine or oleo-margarine imported, exported, or sent away. It is forbidden to sell margarine or oleo-margarine except in such wrappers with the above-mentioned descriptions; and in all bills, invoices, railway receipts, etc., the goods must be distinctly described as margarine or oleo-margarine. Failure to comply with these regulations will be held to indicate that the goods are butter.

The inspectors mentioned above (or other special experts appointed by the Government) have the right to enter premises where butter is made for sale, customs stations, ports, and railway stations, to take samples of the manufactured goods prepared as butter, and to transmit such samples to laboratories designated by ministerial decision. Such samples (as well as the expenses of the examination) will be paid for by the State, unless fraud is proved against the proprietor.

Persons knowingly infringing the provisions of the present law are liable to imprisonment for a period of from six days to three months, and to a fine of from 4*l.* to 200*l.* Inability to furnish the name of the seller or consignor will not be admitted as an excuse for infraction of the law. Carriers or transport companies are liable to a fine of from 2*l.* to 20*l.* for carrying margarine in packages not properly labelled. The use of unsound materials or of substances injurious to health will be dealt with under the penal code. A second offence within a year after conviction will always be punished by the maximum fine.

BELGIAN LAW ON THE ADULTERATION OF FERTILISERS AND FEEDING STUFFS.

The Board of Agriculture have received through the Foreign Office a copy of the Belgian law of 21st December, 1896, concerning the adulteration of fertilisers and feeding-stuffs, together with the regulations for its execution. The main provisions of this new law, which repeals that of 1887, and of the accompanying regulations, are as follows :—

Every delivery of a simple or compound fertiliser containing at least one of the essential fertilising principles (nitrogen, phosphoric acid, potash) must be accompanied by an invoice setting out the nature of the material, the percentage of the fertilising ingredients, and the chemical state of these ingredients. Feeding-stuffs containing essential nutritive principles (albumen, fats) must be accompanied by a similar invoice when the quantity delivered exceeds 50 kilogrammes (110 lbs.) of an uncompounded substance, or 25 kilogrammes (55 lbs.) of a compound substance. The invoice, if not actually sent with the goods, must be sent to the consignee within the next four days at latest.

These provisions do not apply to fertilisers which are the produce of the natural resources of the farm or the spontaneous produce of the soil, or to feeding stuffs which are derived directly from the soil, or which are by-products from certain industries, provided they are delivered under their exact denomination and in their natural state. Among such fertilisers are ashes ; soot ; sweepings of houses, slaughter-houses, and agricultural factories ; simple farmyard manure, etc. ; and, among feeding stuffs exempted are by-products from sugar-refineries, breweries and distilleries.

If the fertiliser is sold or delivered as containing also an ingredient for which special stimulating properties are claimed (such as insecticides, cultivations of useful microbes, etc.), the specific property of such ingredient, and its proportion to the whole quantity, must also be stated. A similar provision applies to feeding stuffs containing ingredients specially favourable to animals, such as aromatic, tonic, or aperient substances, sea-salt, phosphates or other chemical compounds, etc.

Fines or imprisonment may be imposed for infractions of the law, the maximum being £1 (or seven days' imprisonment) for failure to supply a proper invoice, and £80 (or six months' imprisonment) for false statements on the invoice, or for selling the goods under a false denomination. For a second offence, the punishment in either case may be doubled. If the consignee is prejudiced to the extent of one-quarter of the value or more, he obtains the right to a corresponding reduction in the price.

LOCAL TAXATION ON AMERICAN FARMS.

According to a report recently issued by the Statistician of the United States Department of Agriculture, there is probably no question in the administration of public affairs in America which has created more interest among farmers than that of local taxation, nor has legislation upon any other subject in that country been framed with more regard to the opinions of agriculturists. It is maintained that in fully three-fourths of all the States in the Union the existing laws governing local taxation have been dictated by farmers, and that so far as can be ascertained they include everything which any considerable number of the farming class have ever demanded.

But one remarkable peculiarity of the whole system of local taxation in America as it exists to-day seems to be that, generally speaking, though of course with many exceptions, the system apparently works badly and most unjustly towards farmers in those districts where the law is most faithfully, intelligently, and efficiently enforced. As a rule, all over the country, the better the law is from the farmer's theoretical standpoint the worse it is said to be for him in practice; and the more faithfully it is administered the more does the average farmer suffer from its effect.

A careful investigation into the reasons for this failure of methods of taxation has long been desired, and has been the subject of much consideration in the Department of Agriculture and elsewhere. Many independent investiga-

tions have been made, sometimes by local officials, but more often by unofficial students. But all the statistics thus far obtainable have been subject to one objection—they have necessarily confounded the affairs of farmers with those of the residents of villages and small towns. And even where, as in Massachusetts, a census of farms has been taken separately from all other property, with a statement of the value of land, of buildings, and of movable property separately, the census makes no claim to a complete analysis in these respects.

The Secretary of Agriculture therefore directed the employment of a few experts to make a thorough investigation in purely farming districts of those facts which need to be known before any intelligent discussion of this subject can be had. They were instructed to visit as many farms as possible within the short period allowed to them, and personally to inquire and estimate the value of all visible property upon each farm.

In compliance with these instructions the experts personally visited 1,114 farms in 1895, in the extreme eastern and western sections of the State of New York. They obtained from the owner of each farm his personal estimate of the actual market value of his entire visible property, separating buildings from land, and also separating from the natural value of the land in its primitive form the value given to it by cultivation, for the purpose of studying the possible effect of that provision in the constitution of California of 1879 which directs that cultivated and uncultivated land shall be assessed alike: a provision which has been interpreted by the American courts as meaning that the most highly cultivated land is to be assessed no higher than it would be if it were absolutely without cultivation.

The valuation of personal property has been confined strictly to that which the expert could see for himself. No inquiry has been made into the farmer's bank account, bonds, and mortgages, promissory notes, or invisible property of any kind; although, by the laws of New York, farmers, as well as all other classes, are assessed and subject to taxation upon this invisible property. Inquiry

into these matters was purposely omitted, because it was obviously improbable that true answers could have been obtained. By confining the inquiry to things which the examiner could see with his own eyes, he was able to correct the farmer's valuation by his own judgment; and the statistics given are the result of full and fair consultation between the Department's agent and each individual farmer.

Every farmer visited, feeling assured from the character of his visitor—who was locally well known—that the information thus obtained would not be given to local assessors, was quite willing to give information; and the Department's agents report that the truthfulness of the statements may be in every respect relied upon. Mistakes of judgment in such matters of opinion must, of course, have been very frequent; and indeed it is not likely that in any one instance the figures were exactly correct. But such errors, when distributed over a wide area, practically correct themselves or at any rate they do not alter the relative proportions of the different farms.

The agents report that, when asked to give a valuation for any other purpose than that of assessment for taxation, the farmers almost uniformly rate the value of both their land and their buildings much too high. Indeed, the sanguine disposition of farmers appears to be so great that they can hardly persuade themselves to reduce the value of their farms even when they know that such valuation will be used as a basis for assessment. With regard to their personal property, however, their disposition is very different. Not only are they disposed to put an excessively low valuation upon their cattle, farming implements, furniture, etc., when making returns to the tax-gatherer, but they are also disposed to put a valuation at least sufficiently low upon these things when making returns which they know will not be used for the purposes of taxation.

The general result is that, while the statistics are given precisely as they come from the farmers themselves, in the judgment of the Department of Agriculture the valuations of land and buildings are, upon the average, too high, while the valuations of personal property are, upon the average, too low.

The counties covered by the investigation were the counties of Cattaraugus and Chautauqua—which are almost purely agricultural, though somewhat affected by vicinity to oil regions—the county of Putnam, and the upper part of Westchester County, which, while mainly agricultural, are largely affected by the vicinity of New York City, and the summer residences of many wealthy people. The 1,114 farms embraced in the enquiry covered an area of 76,474 acres of cultivated land of the value of 653,233*l.*, or 8*l.* 10*s.* per acre; and 64,766 acres of uncultivated land of an average value of 3*l.* 2*s.* 6*d.* per acre. The buildings on the farms were valued at 659,211*l.* Thus the total value of the entire real estate in the farms was put at 1,512,042*l.* After consulting with the farm owners the experts calculated the unimproved value of the farms to be 592,123*l.*, while the personal farm property was estimated at 205,726*l.* The farms are assessed for purposes of taxation at a value of 963,944*l.*, viz., 920,652*l.* for real property, and 43,292*l.* personal property. The total amount of the local taxes paid upon them and the personal property connected therewith is 8,887*l.*, or 1*s.* 3*d.* per acre.

Condensed into the smallest space, the following are the results of the investigation of farm values in these counties:—

County.	Value of Real Estate.	Same without Improvements	Personal Property.
	£	£	£
Cattaraugus - - - -	145,314	54,268	24,597
Chautauqua - - - -	223,653	103,092	24,510
Putnam- - - - -	410,555	145,421	59,222
Westchester - - - -	732,520	289,342	97,397
Total - - - -	1,512,042	592,123	205,726

From this table it will be seen that if farms (the real estate) were assessed only at their unimproved value—that is to say, at what they would be worth without any buildings, fences, drains, or cultivation—their assessed valuation would bear the following relation to the value of all real estate of these farms, viz., 37·3 per cent. in Cattaraugus; 46·1 per cent. in Chautauqua; 35·4 per cent. in Putnam;

and 39·5 per cent. in Westchester; the average for the whole being 39·2 per cent.

Having thus ascertained the proportion which the unimproved land value of farms bears to their entire real estate value, this result is compared with the statistics of the City of Boston. The assessment of May 1st, 1896, gave the following results for Boston: Real estate, 160,471,187*l.*; land, excluding buildings, 93,160,354*l.*; personal property, visible and invisible, 43,960,044*l.* This shows that the value of the land without improvements in the City of Boston amounted to 58.1 per cent. of the whole value of real estate.

The total assessed value of real and personal property in Boston amounted to 204,431,232*l.*; the personal property assessed, much more than half of which belonged to the invisible class, amounted to 21.6 per cent. of the total. Excluding Boston, the total assessed value of all Massachusetts property was 297,967,115*l.*; the value of assessed personal property was 77,356,546*l.*, being 26 per cent. of the whole. Thus, the largest city in the State paid a very much smaller proportion of taxes on personal property than the rest of the State paid.

It having been entirely impracticable to obtain a statement of the invisible personal property of farmers in the course of the inquiry, there are no means of comparison on that point. There is, however, very little doubt that the invisible personal property—that is to say, the money in banks, bonds and mortgages, debts due, and the like, belonging to the farmers, who are the subject of this investigation, and who are generally much more prosperous than the average of farmers throughout the Union—must have been quite as much as the amount of their visible chattels. Upon this estimate their taxable personal property would have amounted to about 25 per cent. of all their real and and personal estate combined.

The actual assessment of personal property on the farms investigated was only 4.5 per cent of the assessed value of their real and personal estate, being only about one-third of the proportion which their actual visible chattels bore to their entire property.

AMERICAN PHOSPHATES.

The variety and extent of the American phosphate business has now grown to be very large. The rock is divided into three principal classes, known to the trade as Carolina land and river rock, Florida hard rock and pebble, and Tennessee black rock, each possessing its own peculiar advantages, viewed from a commercial standpoint.

Carolina rock is found along the margins of the navigable rivers in the State of that name, and also in the beds of the rivers. As much of it is conveniently near to main railway lines, it is quickly mined, and can be delivered cheaply alongside of steamers and sailing vessels for shipment abroad; it is also easy to load on railway cars for consumption in the interior.

The Florida phosphate deposits are found in nearly every part of that State, the hard high grades, however, being confined to the northern, central, and western sections, and the pebble rock being found in the old and new river beds. The character of the rock is about the same in average quality and variety as that found elsewhere, although a large part of it is difficult to handle, many of the deposits being situated more or less remotely from ports and railways.

The phosphate discoveries in Tennessee during recent years show the rock to be of different quality from the Carolina and Florida deposits. In appearance it is of darker colour, denser, and does not need washing or grinding; it is of good grade, but is generally found at remote interior points, so distant from railway stations and shipping places as to entail considerable expense in getting it to market. The nearest water outlet for Tennessee rock is at Pensacola, situated on the extreme western Gulf coast of Florida, at a distance of about 400 miles from the phosphate beds.

The use of Canadian apatite in the United States has been materially checked of late years by the competition of the French rock from Algiers and Tunis, and it is believed that the depression in the demand for apatite is most likely to be permanent. Indeed, it seems quite probable that in time the Algerian mines will yet become an important competitor in European markets with the

mines of Carolina and Florida. The Algerian rock containing comparatively little iron and aluminium, is easy to work, and with cheap freights could, it is said, compete with any phosphate of the same grade in European markets.

[*Foreign Office Report, Annual Series, No.* 1857. *Price* 2½*d.*]

IMPORTATION OF HORSES INTO BELGIUM.

The Board of Agriculture have received information through the Foreign Office that a new decree, dated March 14th, 1897, relating to the sanitary condition of imported horses, came into force in Belgium on April 15th last. It is stated in the Report to the King that horses imported into Belgium for slaughter were in many cases considered capable of still rendering some service, and were consequently not slaughtered on arrival, but reserved for further work. As these were often found to be suffering from glanders or farcy, Belgian horses were thus contaminated with this disease.

Under the new decree, all horses brought into Belgium are to be inspected on arrival at the cost of the importer. Horses imported for slaughter will be marked with a metallic button, and must be forwarded direct to a slaughter-house, and there killed within eight days at latest. In default, the animals will be slaughtered by the authorities without indemnity.

Horses of suspicious origin and not declared for slaughter, horses of low value, and all those suspected of glanders and farcy, or of having been exposed to contagion from this disease, are to undergo an injection of mallein. With this intent they are to be retained under observation at the frontier, at the expense of the importer, during three days at least. Animals found to be affected with glanders or farcy will be slaughtered, without indemnity, within three days at latest.

The inspection fee is fixed at 2s. 6d. per head for horses which have to undergo the mallein test, and at 10d. for others.

The only ports by which horses can be imported into

Belgium are Ostend, Ghent, and Antwerp, and it is to these ports, and the frontier station of Esschen, that the above decree is more particularly to apply, at least for the present.

The above regulations do not apply to horses which merely pass through Belgium in transit.

Italian Agricultural Loan Societies.

In a recent report on the economic and financial situation in Italy, Major E. Fitzgerald Law, Her Majesty's Commercial Attaché at Rome, states that the Monti Frumentari, as an ancient co-operative institution, afford remarkable evidence of the national inclination to co-operation for practical affairs, at a period long prior to the development of modern theories on the subject. Monti Frumentari existed at one time or another in many parts of Italy, but their original constitution was very primitive, and their number appears to be steadily diminishing. The object for which they were founded was to assist small landowners, or peasant proprietors, in the purchase of seed and cattle, by a system of local credit. The most ancient institution of this class is stated to have been founded in 1421, in the province of Sassari, in the island of Sardinia. It appears that in each parish of the province a field was reserved for the cultivation of grain under the superintendence of the priest, labour being contributed on Sundays by all adult parishioners. The produce of this parochial field formed the capital of the institution, and, in case of necessity, any parishioner could obtain a loan of seed, repayable with interest at 4 per cent., in kind, at the next harvest. Surplus reserves of seed were sold from time to time, and the money realised was lent for the purchase of cattle, interest on these cash loans being fixed at $2\frac{1}{2}$ per cent. Under such regulations the funds of many of the Monti Frumentari became in time very considerable, and in excess of the requirements for which they were founded. This prosperity, however, appears to have proved the cause of their ultimate collapse, since, the control gradually passed

into the hands of the richer classes, who had originally nothing to do with them, and loans of large sums were granted without the caution or security provided by the jealous control of the parish priest and his poorer parishioners. Another cause of the dissipation of the funds of the Monti Frumentari was the passing of a law in 1852 authorising the employment of their resources for the construction of roads and other local objects of public utility.

[*Foreign Office Report, Miscellaneous Series, No.* 417. *Price* 4*d.*]

Export of Fertilisers to Martinique.

The fertilising agents imported into Martinique viz., chlorate of potash, nitrate of soda, superphosphate of lime, and ammonia, come chiefly from England; all are imported in large quantities. Mr. G. Borde in his report to the Foreign Office on the Trade of Martinique, draws the attention of British manufacturers to the fact that, for some time past, there has been a marked tendency to order superphosphate of lime from New York. The fact is that, after experimenting, the substance was found to be just as good as that imported from England, and costs less—probably on account of the fossils being nearer at hand in the States, whereas the British manufacturers have to import them at great cost either from Canada or Florida. The same applies to nitrate of soda, which is now got from Chili direct. Owing to these direct importations, the planters are enabled to purchase their artificial manures at moderate prices.

[*Foreign Office Reports, Annual Series, No.* 1897. *Price* 1½*d.*]

Agricultural Machinery in France.

In France a considerable trade is done in agricultural machinery by English and American firms which have houses and depots in Paris, and stocks at Bordeaux and other places, but, Mr. Consul Warburton states, any other British manufacturers wishing to get a share of that trade would have to go to the expense of such depots,

and spend money in exhibiting at the country agricultural shows to prove the value of their wares. The existing demand is principally for marks which have made their reputation years ago after considerable outlay and persistent advertisement, farmers being very conservative. Most of the great British makers are represented in Paris in the way mentioned, and some keep stock, and for these goods there is still a good sale. The French makers of portable engines are numerous.

[*Foreign Office Reports, Annual Series, No.* 1852. *Price* 1½*d.*]

English Agricultural Machines in Italy.

In a Report to the Foreign Office on the Economic and Financial Situation in Italy, Major Fitzgerald Law says that he fears that long periods of prosperity have had a tendency to incline the managers of English manufacturing houses to the idea that the duty of an agent or traveller is to sell the particular class of article which they are accustomed to produce, and which, in itself, they know to be good, rather than to endeavour to meet the demands of customers whatever they may be. Major Law states that this tendency has certainly caused serious prejudice to the agricultural machine trade, since England was probably the first country to appreciate and manufacture good agricultural machines, and the deserved reputation of English agriculturists was such that enterprising foreign landowners naturally looked, in the first instance, to England to supply them with agricultural machinery. To-day, however, with the important exception of portable engines and steam threshers, England has practically lost the trade in such machinery. Reaping and mowing machines and hay rakes are almost universally of American manufacture, whilst ploughs, drills, and other small machines are generally of German or Swedish origin. And the reason of the change is not far to seek. In England horses are strong and can drag heavy machinery, and farmers are prepared to pay good prices for highly finished, strong machines, solidity being specially appreciated, and weight,

within certain limits, being immaterial. On the Continent, speaking generally, horses are smaller than in England, and weight is a very important condition, whilst real finish is not fully appreciated, and lowness of prime cost is all important. American, German, and Swedish agricultural machinery may not always be of as good material or as well finished as English, but it satisfies ordinary foreign requirements in the more important conditions of weight and price, and consequently it drives English rivals out of the market.

[*Foreign Office Reports, Annual Series, No.* 417. *Price* 4*d.*]

Agricultural Exhibition at Vienna.

The Board of Agriculture have received information through the Foreign Office that an exhibition of agriculture and forestry will be held at Vienna, by the Imperial and Royal Agricultural Society, from May 7th to October 9th, 1898. The following sections are intended to be of an international character, and will be open to foreign exhibitors:—(1) Machinery and implements for agriculture and forestry; (2) Machinery and implements for agricultural industry; (3) Dairy machinery and appliances; (4) Fertilisers, feeding stuffs, and chemical products for agriculture and forestal purposes; (5) Veterinary science; (6) Agricultural improvements, building, and engineering; (7) Agricultural and forestal education, research work, statistics, and literature. There will also be temporary international exhibitions of poultry, birds, and dogs.

Forms of entry and detailed programmes can be obtained from the committee of the exhibition, at 1, Herrengasse 13, Vienna, and intending exhibitors must forward their applications for space to the committee not later than June 30th, 1897.

REPORTS ON FOREIGN CROPS.

Crops in India.

The Statistical Bureau of the Government of India published on the 12th March last the second general memorandum on the wheat crop of the season 1896-97. In the first general memorandum on the crop, issued on the 24th December, 1896, it was stated that the failure of the autumn rains had interfered with ploughing and sowing except on irrigated land; that therefore the area sown with wheat had been greatly contracted, especially in Central and Western India; that prospects seemed very unfavourable until the third week of November, when rain permitted of the sowing of additional land, and improved the condition of the growing crop; and that at the time of writing prospects were more favourable, especially in Northern India, but that the winter rains were being anxiously looked for.

The winter rains came somewhat late, but they were copious and well distributed, and much benefit was done to the growing crop, especially in the Panjab, where much of the wheat is irrigated. On such land prospects were at the date of the second memorandum very good, but more rain was wanted immediately for unirrigated land. In the North-Western Provinces also the prospects were very good as regards that portion of the crop which was sown in due season. In both the Panjab and the North-Western Provinces a fair yield was expected; but it must be observed that the area which will return a crop is relatively small. In the Panjab it is 13 per cent. smaller than the area of 1895-96, and 15 per cent. smaller than the average, the decrease being confined to unirrigated land. In the North-Western Provinces the area is quite 30 per cent. smaller than the average, and as on this reduced area the yield was expected to be 20 per cent. below the

average, it may be taken that the yield for the province will not be more than about 56 per cent. of an average crop —perhaps it may be put at about three-fifths of an average. In Bengal the yield was estimated at about two-thirds of the average, say, 66 per cent.

On the whole, therefore, these three provinces of Northern India will not have any large surplus of wheat for sale outside India. The conditions in these tracts, however, compared favourably with those of Central and Western India, where, roughly, only half the average area was sown, and on that reduced area the yield was expected to be far below the average.

The following paragraphs summarise the provincial reports which had been received:—

In the Panjab the area sown with wheat is estimated at 6,001,800 acres, which is 891,600 acres (nearly 13 per cent.) below the area sown in 1895-96. Though the winter rains were late, they were generally copious and well distributed. They induced additional sowings in some districts and also immensely improved the prospects of the crop throughout the province.

In the North-Western Provinces and Oudh the area sown is reported to be 70 per cent. of the average. The prospects of the crop generally were, however, everywhere good, and, with a continuation of favourable conditions, the yield was expected to turn out more than 80 per cent. of a full average crop on the reduced area sown.

In Bengal the area is estimated at 1,234,500 acres, being about 12·7 per cent. smaller than the area of 1895-96 and 14·3 per cent. below the average. The outturn was reported at the end of January to be between ten and eleven annas, or two-thirds of an average crop, which is much the same as was obtained last year. In the Patna and Bhagalpur Divisions, which contain about five-sixths of the whole wheat-growing area, a twelve and a nine-anna crop respectively were expected, but elsewhere there will be less than half an average crop.

In the Central Provinces about 2,036,000 acres, being half the average, had been placed under wheat. This area is

also about half a million acres smaller than the very contracted area sown in 1895-96. The winter rains were, as in Northern India, fairly general and well distributed, and had, on the whole, done much good to the crop, but the yield was not expected to be generally satisfactory.

In Bombay and Sind the total area sown is estimated at 1,664,500 acres, or 36 per cent. less than the area sown in 1895-96, and 44 per cent. less than the average. The contraction is general, but is very marked in the Deccan and Karnátak, owing to the failure of the late rains. The crop on the irrigated area was reported to be fair, but the dry crop was expected to give a very poor yield. In Sind the area is estimated at 358,500 acres. This is 12 per cent. more than 1895-96, but is 33 per cent. below the average. The crop was good in Hyderabad and the Upper Sind Frontier, fair elsewhere.

In Berar the area estimated to have been sown is 356,960 acres, which is less than half the area of 1895—96, and the yield was estimated at 4 annas only.

In the Nizam's territory the area was estimated at 1,397,688 acres, against 1,661,698 acres in 1895-96, and the yield at $6\frac{1}{2}$ annas, against $11\frac{1}{4}$ annas in 1895-96.

CROPS IN THE UNITED STATES.

The condition of winter wheat in the United States on the 1st of June, as reported by the Statistician of the United States Department of Agriculture, averaged 78·5 for the whole country, compared with 77·9 at the same period last year. The area under the crop is returned at 21,562,000 acres, and the extent of land sown with spring wheat is estimated at 13,000,000 acres, so that the total area under wheat is 34,569,000 acres, or 99·9 per cent. of that harvested in 1896.

The total area sown with oats is estimated at 93·3 per cent. of last year's acreage, or 25,719,000 acres. The condition of the crop on June 1st was 89 as compared with 98·8 at the corresponding period last year.

Barley is reported to cover an area of 2,721,000 acres, or 92·2 per cent. of the acreage sown in 1896. The average condition of the crop in June was 87·4, against 98 in the same month of 1896. The acreage of rye this year is estimated at 1,703,000 acres.

Cotton has been sown on 24,000,000 acres: a diminution of 600,000 acres compared with the area under this crop in 1896. The average condition of the crop was put at 83·5, as against 97·2 at the corresponding period of last year.

CROPS IN RUSSIA.

The St. Petersburg *Journal of Industry and Commerce* states that the snow melted somewhat earlier than usual in Russia this spring, but that the subsequent weather was cold and dry, with results unsatisfactory to the winter crops, more especially in the south and centre of the empire. Dry weather during the preceding autumn had also been unfavourable to the newly sown crops in many districts. Towards the extreme south and south-east, however, although the winter crops have suffered severely, it is expected that the final yield will not be so seriously affected, as the area under winter grain is comparatively small. It is also stated that considerable areas, more particularly those devoted to rape, in the south-west had been resown with spring corn. Field mice had done some damage in the central governments. Prospects were better in the rest of the empire, notably in Poland and the Baltic provinces, where they were described as very good.

CROPS IN AUSTRIA.

The *Wiener Landwirtschaftliche Zeitung* of 26th May last, quoting from the report of the Austrian Ministry of Agriculture, states that the weather in that country during the first half of May was abnormally cold and wet, with falls of snow; but the frosts were not generally injurious, as they were mostly slight. In some parts of the empire vegetation

was normal, in others it was late, in consequence of this unsuitable weather. The general condition of the autumn-sown crops had more or less deteriorated during the preceding month, especially in districts where there had been much rain or snow. Rye had suffered most, notably in the Alpine provinces. There were, however, favourable reports of the condition of this cereal from some localities. Wheat had been less affected by the inclement weather, and its condition was fairly good; there was a good deal of rust. Rape in Bohemia and Moravia looked well, but was not satisfactory in Galicia. The sowing of the spring crops had been greatly hindered; barley and oats were in many places not yet in the ground, while potatoes, roots, and maize were even more backward. Crops sown in March generally presented a better appearance than those sown later. On the whole, however, the condition of the spring crops may be described as fairly satisfactory.

CROPS IN DENMARK.

According to the *Ugeskrift for Landmænd*, the condition of the winter-sown cereals in Denmark at the end of May was generally indifferent, owing to the cold winds and night frosts in the early part of that month. Rye, particularly, had suffered from these untoward climatic conditions, although both this grain and oats exhibited some improvement with the advent of the warmer weather in the last week of May. Spring-sown grain, on the other hand, was doing well everywhere. Fodder, roots, and sugar-beet were also promising, and meadows and grass land were in good condition.

The final returns of the results of the harvest of 1896 show that the yields of the principal crops were as follows:—Wheat, 4,940,000 bushels; rye, 18,620,000 bushels; barley, 22,040,000 bushels; oats, 36,100,000 bushels; and potatoes, 20,520,000 bushels.

CROPS IN FRANCE.

According to the estimates published by the Ministry of Agriculture giving the condition of the crops in France

on the 10th of May, 1897, the state of winter wheat was reported to be good or very good in 37 departments, passable or fairly good in 45, and indifferent in 4 departments. Spring wheat is only cultivated in 51 departments. Of these 28 were reported as good or very good.

Rye was reported to be good or very good in 43 departments, and passable or fairly good in 40.

With regard to oats, 48 departments showed a record of good or very good, in 25 departments the state of the crop was considered to be fair, and in two departments indifferent or bad.

The condition of barley was estimated to be good or very good in 42 departments, passable or fairly good in 20 and indifferent in one. In 10 departments the barley was not up at the time of making the estimate.

In the case of potatoes, the condition of the crop was reported to be good or very good in 20 departments, and fairly good or passable in 17; but in 49 departments, the haulms were not up on the 10th May.

CROPS IN GERMANY.

The Prussian official returns of the condition of the crops state that the temperature during the middle of May had fallen very low, and that this, combined with almost unceasing rain, had acted unfavourably on the crops, the condition of which was hardly as satisfactory as in April. Night frosts had occurred, the damage from which could not as yet be ascertained, although it appeared to be, generally speaking, but slight. Complaints were received from many localities as to insects, especially wireworms.

Autumn wheat had resisted the unfavourable climatic conditions best; its general condition may be described as average to good. Rye had been a good deal laid by the rain, while snow had in many cases broken the stems; it promised only an average crop. Spring sowing was not yet finished, oats being especially late. What was sown, however, had sprouted well, but there were large quantities

of weeds. Work was most in arrear with potatoes, owing to the continuous rain. The seed potatoes were in many places rotting from the same cause. Clover had improved in some provinces and deteriorated in others.

CROPS IN HUNGARY.

Reports by the Hungarian Ministry of Agriculture (quoted in the *Wiener Landwirtschaftliche Zeitung* of April 28th) state that unfavourable weather during the spring greatly hindered cultivation. Spring crops which have sprouted progressed with difficulty; they looked well, but were suffering from too much wet. The same applied to autumn wheat, rye, barley, and rape. In some places the wheat had become yellow, and in others there were traces of rust; in general, however, its condition was satisfactory or good, and the same could be said of rye. Rape stood well in some places, but was poor in others; with few exceptions winter barley was in a fair average condition. Winter corn generally suffered from insects and grubs.

CROPS IN ITALY.

In the *Gazzetta Ufficiale* of May 20th last it is stated that the wheat and maize crops in Italy were generally in a very satisfactory condition in the middle of May, although in a few districts, there were complaints of injury caused by the cold winds in the early part of the month. Forage crops and meadows were flourishing, and an abundant yield of hay was expected. Vines were healthy and promising.

PARLIAMENTARY PUBLICATIONS.

Board of Agriculture.—Annual Report of Proceedings under the Tithe and other Acts administered in the Land Division. [C.—8377.] *Price* 1½*d.*

The total number of applications to the Board under the provisions of the Tithe Acts was 721 in 1896, as compared with 809 in the previous year. Of these 420 were application for redemption of tithe rent-charge, and 174 were for altered apportionments of tithe rent-charge.

The total number of enfranchisements completed by the Board under the Copyhold Act was 304 in 1896, as compared with 275 in 1895, and proceedings in 259 other cases have also been commenced.

The final awards under the Inclosure Acts were sealed during the year in regard to Darwen Moor, High Road Well Moor, Halifax, and Bexhill Down, Sussex. The effect of the proceedings in all these cases is that the lands mentioned will be preserved as open spaces under the control of the local authorities.

In 1896 the Board received 152 applications under the Universities and College Estates Acts for their consent to sales, purchases, and exchanges of property; to improvement loans, and other transactions.

Sixty-two applications were made in the past year for the Board's approval of the sale of glebe lands; and 216 applications were also made for their sanction to expenditure under the Drainage and Improvement of Land Acts.

Umpires under the Agricultural Holdings Act, 1883, were appointed by the Board in eleven cases in 1896.

Board of Agriculture.—Agricultural Returns for Great Britain, 1896, *showing the Acreage and Produce of Crops, Prices of Corn, and Number of Live Stock, together with Summary of Agricultural Statistics for the United Kingdom, British Possessions, and Foreign Countries.* [C. 8502.] *Price* 1s. 8d.

This annual compilation of Agricultural Returns has again been enlarged. As in the past two years, it comprises in a single volume, in their final and complete form, the customary statistics respecting the crop areas and live stock on the farms of Great Britain, which have been already placed separately in the hands of the public as soon as available in seven successive instalments, from August, 1896, to March, 1897. The volume further adds various incidental and foreign data and the "Produce Statistics" of the past year, showing, in more detail than has been given before, the yield of the several crops. The official "Corn Prices" are also included, and much information has been added respecting the prices of meat, the values and quantities of imports and exports, together with a summary of the returns collected respecting the size and distribution of agricultural holdings, so that the volume forms a general and complete compendium of agricultural statistics for future permanent and convenient reference.

In addition to the various statistical summaries appearing in the report, the volume now presented to Parliament includes 124 separate tables, extending to 278 pages, with an exhaustive tabular index arranged alphabetically. Two coloured diagram maps of Great Britain are supplied, one showing, as before, the grouping of the counties into several more or less distinctive Agricultural Divisions and Sub-Divisions, and another exhibiting the relative density and numbers of the cattle of the country, a matter which has formed the subject of certain new tables in the returns. The maps may be found useful by students of the returns, as furnishing in a graphic form an approximate indication of the varying agricultural character of particular sections of the country.

In a general report to the President, prefacing the tabular matter, Major Craigie reviews some of the features presented

by the returns of 1896, and with a view of showing the general distribution of the surface and the distinctive difference as regards arable land, permanent pasture, and rough grazings, offers some general statistics which may be reproduced as under:—

AGRICULTURAL DIVISIONS.	Total Area of Land and Water.	Returned as under Woods and Plantations.	Approximate Area of Mountain and Heath Land used for Grazing.	Permanent Pasture.	Arable Land.
ENGLAND:—	*Acres.*	*Acres*	*Acres.*	*Acres*	*Acres.*
Eastern Counties	14,639,000	825,000	191,000	5,087,000	6,851,000
Western Counties	17,905,000	841,000	1,948,000	8,167,000	4,626,000
Total England	32,544,000	1,666,000	2,139,000	13,354,000	11,477,000
WALES	4,774,000	182,000	1,128,000	1,977,000	858,000
SCOTLAND:—					
Eastern Counties	6,545,000	457,000	2,121,000	519,000	2,174,000
Western Counties	12,909,000	421,000	7,295,000	876,000	1,327,000
GREAT BRITAIN	56,772,000	2,726,000	12,583,000	16,726,000	15,836,000

In the comments offered on the yield of the crops of Great Britain in 1896 the general results are discussed and a table is presented showing the average results of the year and of each season since 1886 inclusive, compared with the mean of the ten years 1886-95. These data, so far as regards the past three summers, may be thus summarised as regards yield per acre of the undermentioned crops, taking the ten years' mean as equal to a standard of "100" in each case.

Crops.	Average of Ten Years, 1886-95.	1894.	1895.	1896.
	Bushels.			
Wheat	28·81 = 100	107	91	117
Barley	32·68 = 100	106	97	103
Oats	38·23 = 100	109	97	96
	Tons.			
Potatoes	5·91 = 100	94	112	107
	Cwts.			
Hay (Clover)	28·10 = 100	116	96	86
Hay (Permanent Grass)	23·39 = 100	122	82	75

The prices of grain in 1896 are compared with the official data extending back for 125 years, and in averages for five-yearly periods since 1866. Quotations have been brought together respecting the prices of meat from such sources as are available, and these are examined and compared in like manner both for single recent years and for five-yearly periods over the last thirty years.

The general report also reviews in detail the growth of imported agricultural produce, and compares this with the changes in population and the advance of the estimated rates of consumption of meat and of wheat in this country so far as data available for comparison exist in the past twenty years. The closing pages of the report on this occasion are devoted to a more detailed examination than has been previously attempted of the parallel changes occurring during the same interval at home and abroad in the recorded acreage of wheat and numbers of live-stock, in those countries and colonies whence complete series of official data have been placed at the disposal of the Board and embodied in these annual returns of successive years.

Board of Agriculture.—Returns as to the Number and Size of Agricultural Holdings in Great Britain in the year 1895, [C.—8243.] *Price* 4½*d.*

This volume contains the special returns which have been prepared with a view to exhibit the number, size, and distribution of Agricultural Holdings in Great Britain in 1895, together with Major Craigie's explanatory report thereon. The acreage which is accounted for in the present return is, in every case, that returned in the year 1895 as under "crop, bare fallow, or grass," and it does not, therefore, include the rough grazings attached to many farms in hilly districts, whereof the surface is only approximately estimated from year to year.

This area was farmed in 520,106 holdings, the distribution of which is shown in the tables in eight classes from 1 acre to over 1,000 acres. Of the whole, 23 per cent. in number, but little over 1 per cent. in acreage, are of the type of 1 acre

to 5 acre holdings. More than two-thirds are farms not exceeding 50 acres in extent, while the larger farms exceeding 300 acres form little over 3½ per cent. of whole number. The average size of a holding comes out at 63 acres for Great Britain as a whole, but the tables show great differences between the prevailing size of farms in different countries.

The following table shows the distribution of the holdings in three groups in the four Agricultural divisions of England, in Wales, and in Scotland.

Agricultural Divisions.	From 1 to 5 Acres.		From 5 to 50 Acres.		Above 50 Acres.	
	No.	Acreage.	No.	Acreage.	No.	Acreage.
ENGLAND.						
I.—Eastern and North-Eastern Counties.	20,189	60,830	33,757	636,103	27,237	5,577,712
II.—South-Eastern and East-Midland Counties.	17,600	53,696	32,883	628,015	26,247	4,982,648
III.—West Midland and South-Western Counties.	24,212	71,900	41,678	795,197	32,313	5,524,983
IV.—Northern and North-Western Counties.	25,054	78,842	62,273	1,229,354	36,736	5,205,408
Total for England	87,055	265,268	170,591	3,288,669	122,533	21,290,751
Wales	10,763	35,633	30 969	635,024	18,556	2,167,702
Scotland	20,150	65,891	33,921	608,930	25,568	4,219,645
GREAT BRITAIN	117,968	366,792	235,481	4,532,623	166,657	27,678,098

With regard to the proportion of pasture and arable land, it is observed that many of the smallest type of holdings practically consist of plots or paddocks of permanent grass. While the proportion of arable land to pasture in Great Britain as a whole, in 1895, was as 49 to 51—a nearly equal division of the cultivated area—in the "1-acre to 5-acre" group of holdings twice as much grass as arable land is accounted for, and in over 61,000 instances, in this group of the smallest agricultural holdings in Great Britain the plots are wholly grass.

In the two next larger classes, embracing the holdings from 5 to 20 and 20 to 50 acres, the proportion of arable land to pasture is also far below that of the country as a whole, and there are nearly two acres of grass for every single acre of arable land farmed by the 235,000 occupiers of these 5 to

50 acre farms. In the holdings over 100 acres the conditions are reversed, and the arable area is greater than the pasture. The class of farm in which, on the whole, the use of the plough still most distinctly predominates, is that made up of holdings running from 500 to 1,000 acres in extent.

For the purposes of comparison, the following table, which gives the figures for 1885 and 1895, may be quoted :—

Holdings in Great Britain.	1885.		1895.	
	No.	Acreage.	No.	Acreage.
5 to 50 Acres -	232 955	4 481,354	235,481	4,532,623
50 ,, 100 ,, -	64,715	4,746,520	66,625	4,885,203
100 ,, 300 ,, -	79,573	13,658,495	81,245	13 875,914
300 ,, 500 ,, -	13,875	5 241,168	13,568	5,113,945
Over 500 ,, -	5,489	4,029,843	5,219	3,803,036
TOTAL - -	396,607	32,157,380	402,138	32,210,721

Holdings between 50 acres and 300 acres have thus increased both in number and in acreage, while those above 300 acres in extent have correspondingly diminished. The increase in acreage in the two groups embracing the 50 to 300 acre farms has been 356,102 acres in the 10 years, while the decrease in the area of the farms lying over the 300-acre limit has been 354,030 acres. The holdings between 50 and 300 acres are more numerous by 3,582, or nearly $2\frac{1}{2}$ per cent.; those above 300 are less numerous by 577, a decrease of 3 per cent.

Beyond the half million holdings of Great Britain exceeding an acre, which can be dealt with as regards their number, size, distribution, and agricultural character in some detail, there lie the still more numerous and more minute series of parcels of land occupied by one or other of the many forms of allotment, field garden, or holding of a single acre or less. None of these come within the scope of the regular Agricultural Returns, but a special inquiry into the numbers of these plots has been included in the inquiry of 1895. Although many difficulties were encountered in obtaining the information respecting areas too small to be

included in the annual occupiers' schedules, a total of 579,133 holdings is credited to this group, and these plots are now distinguished into 37,143 acre plots and 541,990 smaller units of cultivation. These figures show some continued increase of this minor type of holding, but a less rapid advance than on the last occasion of inquiry, in 1890, and instances are quoted where there has been some check to the extension of allotment-holding in certain counties.

Swine Fever.—Second Report of Departmental Committee appointed by the Board of Agriculture to inquire into Swine Fever. [C.—8372.] *Price 3d.*

The first Report of the Committee now investigating the etiology, pathology, and morbid anatomy of the diseases called Swine Fever had reference only to one of the diseases which are classed as swine fever, viz.:—the disease which has for many years been prevalent in this country, and is now described as swine fever in the Orders of the Board of Agriculture. Two other diseases were incidentally referred to—viz.: (*a*) pneumonia of the pig with or without swine fever lesions in the alimentary canal; and (*b*) swine erysipelas. The results of investigations made in connection with these diseases have recently been published in a Blue Book, which contains the following information:—

Pneumonia of the Pig.

An important part of the inquiry undertaken by the Committee had for its object to determine whether the pneumonia which is occasionally encountered in pigs affected with swine fever is a lesion caused by the swine fever bacillus, or whether there occurs in this country an infectious disease of the pig, distinct from swine fever, and having pneumonia for its most characteristic lesion.

A very fatal infectious pneumonia is at the present time recognised by continental and American veterinary authors as a disease perfectly distinct from swine fever. This disease was first described in Germany under the name of Schweineseuche, and it is there generally ascribed to a minute bacillus

*See *Board of Agriculture Journal.* Vol. III. No. I. June, 1896.

which was isolated by Schütz. In the United States of America an organism said to be identical with the German Schweineseuche bacterium has been cultivated from pneumonic lesions in the pig.

The Committee, as the result of the observations and experiments on this head, have arrived at the conclusion that the pneumonia which is occasionally encountered as an independent disease of the pig, or in association with swine fever, is not ascribable to contagion, but to the presence of organisms that are generally saprophytic in their mode of life, and which only in particular circumstances (such as lowered vitality and diminished resistance on the part of the pig) are able to multiply in the air passages and lung tissue and thus induce pneumonia. It appears to the Committee that in this country pneumonia of the pig is sporadic and not contagious or epizootic.

Swine Erysipelas.

This disease was at one time confounded with swine fever, but it has for some years been known that the two affections are perfectly distinct. Swine erysipelas is easily diagnosed after death, owing to the fact that it is caused by a bacillus which has very distinctive morphological and cultural characters. In France, Germany, and other continental States the disease is more or less prevalent in the epizootic form, and is held to be responsible for a very serious mortality among pigs. Foreign authors agree in describing it as a highly contagious and infectious disease which is readily spread either by direct contact between diseased and healthy pigs, or by such indirect means as the clothes or hands of butchers, pig-dealers, or other persons who have been in contact with diseased pigs.

The investigations of the Committee have shown that swine erysipelas is a widely distributed disease in the United Kingdom, but during the period covered by their inquiry the Committee have not been able to discover any outbreak of the disease in the acute or epizootic form. All the cases which have been brought under their notice have been of the chronic form associated with disease of the cardiac valves, and the particulars obtained regarding these cases do not

lend support to the view that swine erysipelas is at all common in the acute contagious form in this country, or that the frequently encountered cases with chronic heart lesions represent animals that have survived an acute attack during an outbreak of the disease.

Experiments were made with the object of transmitting swine erysipelas by inoculating or feeding healthy pigs either with blood or cardiac vegetations containing the bacilli or with artificial cultures, but in no instance were the attempts successful.

These materials were, therefore, much less virulent for British pigs than the writings of French and German authors had led the Committee to expect, and this is the more remarkable in view of the fact that, as proved by its effect on small animals (mice and pigeons), the bacillus associated with swine erysipelas in this country did not appear to be appreciably weaker or less virulent than the organism which is the cause of the fatal German *Schweine-rothlauf* or the French *rouget du porc*.

Board of Trade.—Third Annual Report on Changes in Wages and Hours of Labour in the United Kingdom, 1895. [C.—8374.] *Price* 1*s.* 2*d.*

The changes in the wages of agricultural labour during 1895 reported to the Board of Trade have been collected in the same way as in the preceding year, namely, by addressing applications to the chairmen of rural district councils. The particulars refer only to ordinary agricultural labourers, and not to men exclusively engaged with the charge of animals, such as shepherds, cattlemen, carters, and horsemen; the wages are also exclusive of piece-work earnings, extra payments during harvest, etc. It should be noticed that the rates apply only to summer wages, except in the few instances (in the Northern counties) where labourers are hired for a year certain.

It is stated that the total number of persons affected by a change of summer wages in 1895 was 72,400, of whom 7,600 received an increase, and 64,800 had to submit to a decrease

in weekly wages; the net decrease in districts in which changes took place being $9\frac{3}{4}$d. per head per week as compared with 1894. Calculated on the total number of agritural labourers in England and Wales, the fall per head amounts to $\frac{3}{4}$d. per week. It thus appears that the movement of agricultural labourers' wages in 1894-5 was very similar in character, extent, and amount of change to that recorded for 1893-4.

Considering the different districts of England, no less than 77 per cent. of all the labourers affected by a change in wages lived in the Midland and Eastern Counties, the great majority of the remainder being in the Southern and Western Counties. It has not been found possible to estimate accurately the number of men affected by a change in Wales, but, on the whole, the tendency in the Principality would appear to have been towards a rise. In Scotland the changes said to have taken place are too unimportant to materially affect the wages of any particular class. Generally speaking, the wages of the men who remained in the same situations were practically stationary, while some of those changing their places received slightly reduced wages. There was frequently an upward tendency in the wages of women in Scotland. No material changes are reported from Ireland.

Criminal Code, Canada (Gambling in Prices). *H. C.* 135. *Price* $\frac{1}{2}$*d.*

This Return contains the following sections of the Canada Criminal Code of 1892, which came into operation in March, 1893, prohibiting gambling in prices:—

201. Everyone is guilty of an indictable offence, and liable to five years' imprisonment, and to a fine of five hundred dollars, who, with the intent to make gain or profit by the rise or fall in price of any stock of any incorporated or unincorporated company or undertaking, either in Canada or elsewhere, or of any goods, wares, or merchandise: (*a*) without the *bonâ fide* intention of acquiring any such shares, goods, wares, or merchandise, or of selling the same, as the case may be, makes or signs, or authorises to be made or signed, any contract or agreement, oral or written, purporting

to be for the sale or purchase of any such shares of stock, goods, wares, or merchandise; or (*b*) makes or signs, or authorises to be made or signed, any contract or agreement, oral or written, purporting to be for the sale or purchase of any such shares of stock, goods, wares, or merchandise in respect of which no delivery of the thing sold or purchased is made or received, and without the *bonâ fide* intention to make or receive such delivery.

2. But it is not an offence if the broker of the purchaser receives delivery, on his behalf, of the articles sold, notwithstanding that such broker retains or pledges the same as security for the advance of the purchase-money or any part thereof.

3. Every office or place of business wherein is carried on the business of making or signing, or procuring to be made or signed, or negotiating or bargaining for the making or signing of such contracts of sale or purchase as are prohibited in this section, is a common gaming-house, and everyone who, as principal or agent, occupies, uses, manages, or maintains the same is the keeper of a common gaming-house. (51 Vict. c. 42, ss. 1 and 3.)

202. Everyone is guilty of an indictable offence, and liable to one year's imprisonment, who habitually frequents any office or place wherein the making or signing, or procuring to be made or signed, or the negotiating or bargaining for the making or signing of such contracts of sale or purchase as are mentioned in the section next preceding is carried on. (51 Vict. c. 42, s. 1.)

Education Department. Code of Regulations for Day Schools, 1897. [C.—8340.] *Price* 5½*d*. *Revised Instructions issued to Her Majesty's Inspectors and applicable to the Code of* 1897. [C.—8341.] *Price* 5*d*.

The provision made by the Education Department for instruction in agricultural subjects in public elementary schools is contained in Art. 101 of the above Code. Under this article a grant may be made to day schools for older

scholars on examination in certain specific subjects, amongst which are chemistry, botany, principles of agriculture and horticulture, and also for instruction to girls in dairy work and to boys in cottage gardening. The first four subjects are also alternative courses in elementary science taught as a class subject, but no more than two subjects may be taken by any class. With regard to the grant for cottage gardening, it is remarked that this is the practical or experimental side of agriculture or horticulture in small holdings, and may be taken with either of those subjects. There are two ways of setting boys to work at gardening. They may either cultivate a plot in common, or each boy may be provided with a plot of his own. The main object of a school-garden is not to put boys as apprentices in the gardener's craft, but to enable the lessons in elementary science which are given in the schoolroom to be illustrated by practical work in the garden-beds.

Local Government Board for Scotland.—Second Annual Report for 1895-6. [C.—8219.] *Price* 1*s.* 5*d.*

The greater part of this volume is devoted to the statistics of pauperism and the administration of public health in Scotland. As regards poor law finance, the revenue of the various parish councils during the year ending May 15th, 1896, amounted to 1,020,389*l.*, of which 784,250*l.* (or 77 per cent.) was derived from rates, and 187,837*l.* (18 per cent.) from local taxation contributions and Treasury grants in lieu of rates. The amount expended upon the actual relief and maintenance of the poor was 742,163*l.*, while medical relief accounted for a further 50,696*l.*; the total expenditure in connection with the poor (not defrayed out of loans) being 1,037,931*l.*

Technical Education Return, H.C. 357. *Price* 1*s.* 6*d.*

According to this Return the total amount spent on technical education by local authorities during the year 1894-5 in England, Wales, Scotland, and Ireland was 737,809*l.* 5*s.* 4*d.*, and the estimated total expenditure on technical education

during the year 1895-6 was 793,507*l.* 17*s.* 7*d.* These amounts are exclusive of the sums allocated to intermediate and technical education under the Welsh Intermediate Education Act, 1889. The amounts raised by loan on the security of the local rate under the Technical Instruction Acts were in 1894-5, 119,258*l.* 15*s.* 2*d.*; in 1895-6, 152,000*l.* 19*s.* 1*d.*

In England (excepting the county of Monmouth), thirty-eight out of forty-nine county councils applied the whole of the residue received under the Local Taxation (Customs and Excise) Act to technical education, and eleven county councils employed a part of it for the same purpose. Of the councils of the sixty-one county boroughs, fifty-four devoted the whole of the residue to technical education, and seven a part of it. Further, the councils of thirteen county boroughs, sixty-seven boroughs, and 109 urban districts, in England, made grants out of the rates under the Technical Instruction Acts; and seven local authorities devoted funds to technical education out of the rate levied under the Public Libraries Acts. Twenty-five local authorities raised sums by loan on the security of the local rate under the Technical Instruction Acts, during each of the years 1894-5 and 1895-6.

In Wales and Monmouth the thirteen county councils and the councils of the three county boroughs, devoted the whole of the residue grant to intermediate and technical education, chiefly under the Welsh Intermediate Education Act, 1889. In addition, the councils of eight counties, three county boroughs, five boroughs, and seven urban districts, made grants out of the rates under the Technical Instruction Acts; and one of these authorities devoted part of the Public Libraries rate to technical education. In Wales and Monmouth no amounts were raised by loan on the security of the local rate under the Technical Instruction Acts during the two years in question. The estimated total amount to be devoted annually to intermediate and technical education, under the Welsh Intermediate Education Act, 1889—*i.e.*, out of the residue and the local rate—is 42,861*l.*

During the year 1895-6 the ½d. rate under that Act was levied (wholly or partly) in nearly all of the sixteen counties and county boroughs.

The total amount of the residues paid to the councils of counties and county boroughs in England and Wales in respect of the financial year 1894-5 was 755,278*l.* 3s., of which 612,626*l.* 14s. 10d. was appropriated to educational purposes, and 142,651*l.* 8s. 2d. to relief of rates; the latter sum including 108,844*l.* 4s. 2d. devoted by the London County Council to the relief of rates.

As regards Scotland twenty-five out of the thirty-three county councils applied the whole of the residue to technical education, and four a part of it, while four applied the residue to the relief of rates. Of the 204 burghs and police burghs, forty-six applied the whole and fifty-four a part of the residue to technical education; 101 applied the whole to the relief of rates; and three did not furnish returns. No amounts have been applied to the building or maintenance of science and art schools, art galleries, or museums, out of the local rate under the Public Libraries Acts. Five school boards made grants out of the school fund under the Technical Schools (Scotland) Act, 1887, and at the date of the Return another school board had decided to avail itself of the provisions of that Act.

The total amount of the residue paid to the councils of counties, town councils of burghs, and commissioners of police burghs, in Scotland, in respect of the year 1894-5, was 39,300*l.* 14*s.* 11*d.*, of which 28,201*l.* 12*s.* 3*d.* was appropriated to technical education, and 10,864*l.* 11*s.* 7*d.* to the relief of rates; no information having been furnished as to the disposal of the balance of 234*l.* 11*s.* 1*d.*

In the case of Ireland, the residue is not applicable to technical education. Eleven local authorities made grants out of the rates under the Technical Instruction Acts; and one of these authorities also applied part of the rate levied under the Public Libraries Acts to technical education. Two other local authorities (Portumna and Tuam Unions) decided to put the Technical Instruction Acts in force. The Return shows that the total amount expended on technical education by seven local authorities during the year 1894-5 was 4,169*l.* 7*s.* 10*d.*, and that the estimated total expenditure on technical education by eleven local authorities during the year 1895-6 was 4,218*l.* 3*s.* 10*d.*

Appendix to the 62nd Annual Report of the Commissioners of National Education in Ireland for the year 1895. [C.—8185.] *Price* 3*s.* 10*d.*

The Report of the Superintendent of the Agricultural Department to the Commissioners of National Education in Ireland states that the Albert Agricultural Institution at Glasnevin and the Munster Dairy School at Cork have had a full attendance in all their departments, progress being especially marked in the dairy schools. Apart from these two establishments, there were also 46 school farms and 43 school gardens in connection with the Agricultural Department.

Instruction in dairy management has been largely developed during 1895, and is now given (1) to children in National Schools where practicable, and (2) to adults at Glasnevin and Cork, apart from itinerant dairy instruction. There are special classes for creamery managers—young men already engaged in creameries, or who have a prospect of immediate employment in them. It is stated that the creamery system has made rapid strides in Ireland, and the number of such establishments in operation at the end of 1895 is given approximately as follows:—Co-operative creameries, 46; joint-stock creameries, 51; private venture, 136; and butter-blending establishments, 18; total, 251.

At many of the school-farms and gardens, as well as at Glasnevin and Cork, various agricultural experiments have been undertaken, of which the following are among the more interesting.

With the view of testing whether potato haulm and vegetables which had been sprayed with sulphate of copper solutions were deleterious to stock, a few cattle and sheep were supplied with such fodder; none of the animals exhibited any unhealthy symptoms.

Experiments upon the use of manures on pasture seem to show that farmyard manure causes the largest yield of grass upon such soil as that of Glasnevin (a heavy calcareous loam), and that among artificial manures the best are those whose composition appears to be nearest

that of farmyard manure, such as kainit, sulphate of ammonia, and mineral superphosphate.

The experiments upon the use of artificial foods consumed upon grass lands with a view to the improvement of the herbage have also been continued, as regards (1) the value of artificial food in fattening sheep, and (2) the manurial value of food so consumed to the land upon which the experiment was carried out. The best results in feeding the sheep were obtained with linseed cake, which also yielded slightly better results in the weight of the grass; but this grass was not so productive of dry matter as that grown upon cottoncake-manure.

With the object of obtaining information on the question of the effect of various substances used as food "preservatives" upon the health of animals, a mixture of borax and boracic acid was added to the food of a certain number of pigs. The result, so far as the experiment was carried, served to show that the animals did not suffer any injury from a moderate use of these antiseptics; and, in fact, it would appear that for pigs, at least, such use of borax is to a certain extent useful.

IMPORTS OF AGRICULTURAL PRODUCE.

I.—STATEMENT showing the NUMBER of ANIMALS imported into GREAT BRITAIN from IRELAND during the first Four Months of the year 1897, compared with the corresponding periods of 1896 and 1895.

Animals.	Four Months ended 24th April, 1897.	Four Months ended 25th April, 1896.	Four Months ended 27th April, 1895.
	No.	No.	No.
Cattle - - -	164,153	176,934	179,054
Sheep - - -	45,778	43,763	34,946
Swine - - -	264,130	257,040	254,977
Goats - - -	828	772	961
Horses- - -	10,131	10,904	6,841

STATEMENT showing the QUANTITY of HAY imported into the UNITED KINGDOM from the undermentioned Countries during the first four months of the year 1897, compared with the corresponding periods of 1896 and 1895.

(*Furnished by the Board of Customs.*)

Countries whence exported.	Four Months ended 30th April, 1897.	Four Months ended 30th April, 1896.	Four Months ended 30th April, 1895.
	Tons.	Tons.	Tons.
Algeria - -	3,345	2,318	3,576
Belgium - -	3,530	3,567	47
France - -	5,342	7,859	3,446
Holland - -	14,912	9,308	1,711
United States -	10,848	1,264	15,341
Other Countries -	10,647	8,264	3,079
Total - -	48,624	32,580	27,200

III.—STATEMENT showing the QUANTITIES of CERTAIN ARTICLES of AGRICULTURAL PRODUCE IMPORTED into the UNITED KINGDOM in the five months ending May 31st, 1897, and in the corresponding periods in 1896 and 1895.

(Compiled from the Trade and Navigation Returns.)

Articles.	Five Months ending May 31st.		
	1897.	1896.	1895.
Horses - - - No.	22,985	17,744	11,063
Cattle - - - ,,	231,459	231,648	134,457
Sheep - - - ,,	262,913	385,118	370,637
Bacon - - - cwts.	2,121,736	1,801,748	1,763,449
Beef:			
Salted - - - ,,	69,120	105,165	89,631
Fresh - - - ,,	1,114,057	1,033,266	853,902
Hams - - - ,,	602,231	537,088	503,176
Meat, unenumerated:			
Salted or fresh - ,,	163,673	128,411	123,124
Preserved, otherwise than by salting - ,,	251,291	287,153	300,086
Mutton, fresh - - ,,	1,255,084	1,291,664	1,023,995
Pork:			
Salted (not Hams) - ,,	100,084	110,672	93,505
Fresh - - - ,,	158,572	107,928	116,190
Rabbits - - - ,,	89,445	54,907	41,802
Butter - - - ,,	1,367,011	1,291,197	1,242,205
Margarine - - ,,	403,031	384,456	389,422
Cheese - - - ,,	562,566	612,404	576,188
Milk, condensed or preserved - - ,,	298,495	232,460	221,388
,, and cream, fresh - ,,	1,535	4,151*	116,459*
Eggs - - gt. hundreds	5,501,573	4,807,202	4,808,056
Corn:			
Wheat - - - cwts.	27,303,260	24,979,580	30,088,175
Wheat Meal and Flour - ,,	8,296,425	8,868,750	7,546,410
Barley - - - ,,	6,692,210	7,035,910	7,872,347
Oats - - - ,,	4,997,110	4,924,800	5,325,150
Maize - - - ,,	25,690,060	19,882,640	11,417,580
Fruit:			
Apples - - bushels	1,982,737	949,516	1,322,263
Hops - - - cwts.	53,546	93,886	100,889
Onions - - bushels	2,445,591	2,228,524	2,089,302
Potatoes - - - cwts.	581,265	707,609	1,868,547
Lard - - - ,,	692,663	715,939	783,772
Tallow and Stearine - ,,	727,337	993,808	809,793
Hides, wet and dry - ,,	467,395	360,772	495,968
Wool, sheep or lambs' - lbs.	431,768,906	411,361,624	445,818,138
Poultry and Game - value £	328,806	313,240	269,267
Vegetables - - - ,,	534,447	447,752	384,706

* Gallons.

PRICES OF LIVE STOCK

Returned under the Weighing of Cattle Act.

Returns of prices collected under the Markets and Fairs (Weighing of Cattle) Act, 1891, for the first three months of 1897 are now available for comparison with previous data similarly obtained. The total number of animals returned to the Board of Agriculture as entering, weighed, and priced at the 19 scheduled places in Great Britain were as follows in this quarter, and in the first quarters of the two preceding years:—

Animals.	1st Quarter, 1897.	1st Quarter, 1896.	1st Quarter, 1895.
CATTLE:	No.	No.	No.
Entering markets	260,778	260,823	271,648
Weighed	26,672	26,190	24,771
Prices returned	24,274	23,709	22 211
Prices returned with quality distinguished	18,591	17,916	16,818
SHEEP:			
Entering markets	744,927	738,502	710,865
Weighed	8,711	10,116	7,703
Prices returned with quality distinguished.	8,047	8,881	5,279
SWINE:			
Entering markets	43,012	61,745	57,508
Weighed	335	740	345
Prices returned	168	308	232
Prices returned with quality distinguished	168	308	4

A small increase is thus exhibited in the number of cattle, for which weights and prices were given, the total number shown being practically the same as in the like period of 1896. More sheep were recorded as entering these markets, but fewer seem to have been weighed, although in a rather larger proportion of cases prices were quoted in respect of their passing over the weighbridge. In swine there appears to be a great reduction in the numbers marketed in the 19

scheduled places, and a falling off in the returns of weight and prices which are still too small to form a basis for satisfactory averages of current values.

In the general table on page 129 it will be observed that reports as regards live weight prices of swine came only from four places. Reports giving prices of sheep came from ten of the nineteen markets. Cattle prices were supplied from sixteen of these scheduled towns. No quotation of prices was received from either Ashford, Bristol, or Wakefield, and only a very small number from Birmingham, Lincoln, or York. The use of the weighbridge remains much less popular in England than in Scotland, where the practice of selling in auction marts generally prevails. The reports as regards cattle from the fourteen English towns named in the Act of 1891 compare as follows for the first quarter of the present and two preceding years.

Cattle at Scheduled Places in ENGLAND.	1st Quarter, 1897.	1st Quarter, 1896.	1st Quarter, 1895.
Number entering markets	196,039	201,403	210,777
Number weighed	6,333	6,992	6,237
Prices returned with quality distinguished	4,332	4,747	3,709

Thus only $3\frac{1}{4}$ per cent. of the cattle shown in England are recorded as having been weighed, and two-thirds of these cases were reported by London and Liverpool alone. On the other hand, in Scotland at no one of the five scheduled places were less than a thousand head of cattle weighed in the three months, while upwards of 6,500 were weighed in Edinburgh and over 7,000 at Aberdeen. Prices were quoted also for every animal weighed at Aberdeen and in nearly every case at Dundee. The price quotations furnished from Edinburgh and Perth are relatively somewhat defective in their details. The reports from Glasgow are still inferior to those from other Scottish towns, but they show some improvement compared with the first three months of 1896. The following table shows that the total percentage of cattle reported to have been weighed in Scotland was nearly ten times as great as in England, or

over 31 per cent. of the animals exhibited, while prices in complete form were supplied for 22 per cent. of the total cattle shown in the five Scotch towns scheduled under the Act of 1891.

Cattle at Scheduled Places in SCOTLAND.	1st Quarter, 1897.	1st Quarter, 1896.	1st Quarter, 1895.
Number entering markets - -	64,739	59,420	60,871
Number weighed - - -	20,339	19,198	18,534
Prices returned - - -	19,942	18,962	18,502
Prices returned with quality distinguished	14,259	13,169	13,109

The following further table gives for ten of the scheduled places the average of prices per stone and per cwt. ascertained by dividing the total values reported by the aggregate live weight of the animals, and it in the first quarter of this year shows also the number of cattle returned in each grade or category—these figures not including cattle distinguished as stores. It will be observed that the data even in these selected towns are very defective in the third or inferior class, except at Aberdeen, and the general reports received indicate that it is, comparatively speaking, rare to find the weight of the lowest quality of stock tested on the weighbridge.

PLACES.	INFERIOR. (3rd Quality.)			GOOD. (2nd Quality.)			PRIME. (1st Quality.)		
	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.
		s. d.	s. d.		s. d.	s. d.		s. d.	s. d.
Leeds - - -	16	3 6	28 0	73	3 8	29 4	165	4 0¾	32 6
Liverpool - - -	28	3 4	26 8	309	3 10½	31 0	886	4 2	33 4
London - - -	47	3 6¾	28 6	310	4 3¾	34 6	1,007	4 9¾	38 6
Newcastle - - -	18	3 3½	26 4	39	3 9	30 0	435	4 4½	35 0
Shrewsbury - -	41	3 1¾	25 2	166	3 9	30 0	31	4 3½	34 4
Aberdeen - - -	1,425	2 11¾	23 10	3,149	4 0¼	32 4	2,537	4 4¾	35 2
Dundee - - -	192	3 4½	27 0	1,547	4 0¾	32 4	1,003	4 3¾	34 6
Edinburgh - - -	—	—	—	2,654	4 3	34 0	176	4 5	35 4
Glasgow - - -	—	—	—	355	3 11	31 4	326	4 5¾	35 6
Perth- - - -	108	3 9¾	30 6	325	4 1	32 8	342	4 3¾	34 6

With a view of furnishing a means of contrasting the current values of cattle per cwt. with the averages for the first quarter of 1896, in both cases omitting the quotations of prices which are distinguished as those of store cattle, the reports from these ten markets of the sales of fat stock may be compared as under:—

Places.	Inferior or Third Quality.		Good or Second Quality.		Prime or First Quality.	
	1897.	1896.	1897.	1896.	1897.	1896.
	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.
Leeds	28 0	26 0	29 4	29 4	32 6	32 0
Liverpool	26 8	—	31 0	28 8	33 4	33 0
London	28 6	27 8	34 0	33 8	38 6	37 4
Newcastle	26 4	26 4	30 0	31 0	35 0	33 4
Shrewsbury	25 2	25 4	30 0	29 10	34 4	33 8
Aberdeen	23 10	23 6	32 4	3 6	35 2	34 6
Dundee	27 0	24 10	32 4	31 0	34 6	32 8
Edinburgh	—	24 8	34 0	32 2	35 4	33 2
Glasgow	—	—	31 4	32 4	35 6	34 8
Perth	30 6	29 6	32 8	31 2	34 6	32 8

These comparisons, speaking roughly, indicate some improvement in values—a rise occurring in every instance in the prices of prime cattle, and in seven out of ten cases in second grade cattle—while changes in the opposite direction only come from markets of minor importance. The highest average price per cwt. for prime cattle in the first quarter of 1897 was that of London at 38*s.* 6*d.*, and the lowest at Leeds was 32*s.* 6*d.* These markets returned also the highest and lowest prices in 1896.

The number of instances in which fat stock were sold in the scheduled markets by an actual rate per live cwt. were reported to be 878 in this quarter as compared with 779 cases in the same quarter of 1896 and the quotations ascertained in this way ranged from 30*s.* 2*d.* per cwt. at Glasgow, to 34*s.* 6*d.* at London for second class stock, and from 33*s.* 4*d.* per cwt. at Liverpool to 38*s.* 2*d.* per cwt. at London for such prime cattle as were disposed of in this manner.

The customary table, giving details of the extent of weighing at each scheduled place, is appended:—

TOTAL NUMBER of **Cattle, Sheep,** and **Swine,** entering the MARKETS and MARTS of the under-mentioned Places in ENGLAND and SCOTLAND, with the Number WEIGHED, as received from the Market Authorities in the **First Quarter,** 1897, under the Markets and Fairs (Weighing of Cattle) Act, 1891 (54 & 55 Vict. c. 70).

PLACES.	Cattle.			Sheep.			Swine.		
	Total Number entering the Markets or Marts.	Number Weigh'd	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts	Number Weigh'd	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weigh'd	Number Weigh'd for which Prices were given.
ENGLAND.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
Ashford	2,742	72	—	13,308	25	—	3 898	—	—
Birmingham	7 396	4	4	12.986	—	—	767	—	—
Bristol	8,679	—	—	17,092	—	—	—	—	—
Leicester	11 366	235	187	10 829	20	20	1,941	12	12
Leeds	7 500	254	254	25,185	285	285	1,749	167	—
Lincoln	1,811	26	26	14,383	—	—	4,691	—	—
Liverpool	16,000	1,223	1,223	44,481	10	10	--	—	—
London	19,105	2,997	1,364	140,670	445	—	1,810	—	—
Newcastle-upon-Tyne	22,679	493	493	63 982	26	26	8,383	64	64
Norwich	18 549	154	139	46,738	220	220	3 164	—	—
Salford	33,388	368	368	100,618	—	—	613	—	—
Shrewsbury	8,614	412	238	6,075	—	—	2 193	—	—
Wakefield	21,726	58	—	35.175	194	—	166	—	—
York	16,484	37	36	15,190	30	30	1,115	—	—
SCOTLAND.									
Aberdeen	14 336	7,112	7,112	9,341	4,334	4 334	4 555	—	—
Dundee	4 262	2,772	2,761	4.627	1,123	1,123	510	2	2
Edinburgh	16,089	6,511	*2,875	57.514	—	—	1,470	—	—
Glasgow	19,830	1,110	736	90 711	32	32	2,713	—	—
Perth	10,222	2,834	*775	36,032	1,967	1 967	3,274	90	90
TOTAL for ENGLAND	196,039	6.333	4,332	546 702	1,255	591	30,490	243	76
TOTAL for SCOTLAND	64 739	20 339	*14,259	198,225	7,456	7,456	12,522	92	92
Total	260 778	26,672	*18.591	744,927	8,711	8.047	43.012	335	168

* Prices for 3,624 cattle in addition to the above were quoted from Edinburgh, and for 2,059 cattle from Perth, but without distinguishing the quality.

PRICES OF MEAT, CORN, AND DAIRY PRODUCE.

AVERAGE PRICES of DEAD MEAT, per Stone of 8 lbs., at the LONDON CENTRAL MEAT MARKET, during the First Quarter and during the Months of April and May, 1897.

(Compiled from the prices quoted weekly in the "Meat Trades Journal.")

DESCRIPTION.	1ST QUARTER, 1897.	APRIL, 1897.	MAY, 1897.
	s. d. *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*
BEEF :—			
Scotch, short sides	4 1 to 4 4	4 2 to 4 6	4 1 to 4 5
,, long sides	3 9 ,, 4 0	3 10 ,, 4 2	3 9 ,, 4 0
English	3 8 ,, 3 10	3 10 ,, 4 2	3 9 ,, 4 0
Cows and Bulls	2 0 ,, 2 11	2 4 ,, 3 1	2 2 ,, 3 1
American, Birkenhead killed	3 4 ,, 3 6	3 7 ,, 3 9	3 5 ,, 3 7
,, Deptford killed	3 4 ,, 3 7	3 6 ,, 3 9	3 4 ,, 3 7
,, Refrig. hind-qrs.	3 5 ,, 3 9	3 8 ,, 3 11	3 6 ,, 3 9
,, ,, fore-qrs.	2 6 ,, 2 8	2 6 ,, 2 8	2 5 ,, 2 7
Australian, Frozen hind qrs.	2 3 ,, 2 5	2 5 ,, 2 8	2 6 ,, 2 10
,, ,, fore-qrs.	1 11 ,, 2 0	1 11 ,, 2 2	1 10 ,, 2 0
MUTTON :—			
Scotch, Prime	4 4 ,, 4 9	4 5 ,, 4 10	4 2 ,, 4 8
English, Prime	4 2 ,, 4 7	4 3 ,, 4 7	4 2 ,, 4 7
Ewes	3 2 ,, 3 8	3 6 ,, 3 11	3 4 ,, 3 9
Continental	3 11 ,, 4 2	4 1 ,, 4 4	3 11 ,, 4 2
River Plate, Town killed	3 5 ,, 3 7	3 7 ,, 3 9	3 6 ,, 3 8
New Zealand, Frozen	1 6 ,, 2 3	1 10 ,, 2 4	1 11 ,, 2 4
Australian, Frozen	1 5 ,, 1 6	1 10 ,, 1 11	1 10 ,, 2 0
River Plate, Frozen	1 5 ,, 1 6	1 10 ,, 1 11	1 10 ,, 1 11
LAMB :—			
English	6 4 ,, 7 4	6 2 ,, 7 3	5 2 ,, 6 4
New Zealand, Frozen	3 0 ,, 3 4	3 0 ,, 3 5	3 0 ,, 3 3
Australian, Frozen	1 11 ,, 2 7	2 8 ,, 2 11	— —
VEAL :—			
English	4 1 ,, 4 7	3 11 ,, 4 8	4 0 ,, 4 5
Foreign	3 6 ,, 3 11	— —	3 1 ,, 3 10
PORK :—			
English, small	3 5 ,, 3 9	4 1 ,, 4 5	3 10 ,, 4 2
,, medium and large	2 10 ,, 3 3	3 6 ,, 3 11	3 3 ,, 3 8
Foreign	2 10 ,, 3 3	3 6 ,, 3 11	3 3 ,, 3 8

AVERAGE WHOLESALE PRICES of CATTLE and SHEEP, per Stone of 8 lbs., sinking the offal, at the METROPOLITAN CATTLE MARKET, during the undermentioned Quarters of 1896 and 1897 :—

PERIOD.	CATTLE.			SHEEP.		
	Inferior.	Second.	First.	Inferior.	Second.	First.
	s. d.	s. d.	s. d.	s. d	s. d.	s. d.
1st Quarter, 1896	2 4	3 10	4 5	3 4	5 2	5 8
2nd Quarter ,,	2 4	3 8	4 4	3 3	4 9	5 3
3rd Quarter ,,	2 4	3 9	4 4	3 2	4 8	5 4
4th Quarter ,,	2 4	3 9	4 6	3 2	4 10	5 5
1st Quarter, 1897	2 5	3 11	4 6	3 9	5 1	5 9

AVERAGE WHOLESALE PRICES OF BEEF and MUTTON, per Stone of 8 lbs., by the Carcase at LIVERPOOL and GLASGOW, during the undermentioned Quarters of 1896 and 1897 :—

PERIOD.	LIVERPOOL.*		GLASGOW.†	
	BEEF.	MUTTON.	BEEF.	MUTTON.
	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.
1st Quarter, 1896	2 0 to 3 2	3 0 to 4 10	2 8 to 3 8	3 0 to 4 6
2nd Quarter ,,	2 0 ,, 3 4	3 0 ,, 5 0	2 4 ,, 3 6	3 8 ,, 4 10
3rd Quarter ,,	2 6 ,, 3 4	3 4 ,, 4 10	2 4 ,, 3 8	3 4 ,, 4 6
4th Quarter ,,	2 2 ,, 3 6	2 8 ,, 4 6	2 0 ,, 3 8	3 0 ,, 4 4
1st Quarter, 1897	2 8 ,, 3 6	3 4 ,, 5 2	2 8 ,, 4 0	4 0 ,, 5 0

* Compiled from information furnished by the Medical Officer of Health, Liverpool. The prices quoted are for Carcases of Animals *slaughtered at the Liverpool Abattoir*, and do not apply to Imported Meat.

† Compiled from information furnished by the Principal of the Veterinary College, Glasgow.

BERLIN MARKET.

AVERAGE PRICES of CATTLE and SHEEP (First Quality Dead Weight) in the BERLIN CATTLE MARKET in the undermentioned months of 1897.

MONTHS.	CATTLE. Per Cwt.	SHEEP. Per Cwt.
1897.	*s. d.*	*s. d.*
January	56 10 to 60 1	45 0 to 47 5
February	54 6 ,, 58 0	43 9 ,, 45 10
March	54 9 ,, 58 10	45 7 ,, 47 4
April	55 8 ,, 59 5	48 2 ,, 50 3
May	56 0 ,, 59 1	48 10 ,, 50 6

NOTE.—The above prices have been compiled from the weekly returns published in the *Deutsche Landwirthschaftliche Presse.*

PARIS MARKET.

AVERAGE PRICES of CATTLE, SHEEP, and SWINE (Medium Quality) in the PARIS CATTLE MARKET in the undermentioned months of 1897.

MONTHS.	OXEN. Per Cwt.	CALVES. Per Cwt.	SHEEP. Per Cwt.	PIGS. Per Cwt.
	LIVE WEIGHT.			
1897.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
January	31 10	41 4	40 5	27 2
February	31 6	42 7	39 6	27 11
March	30 2	42 1	39 9	33 5
April	30 11	42 5	40 8	32 3
May	31 6	40 11	40 10	31 4
	DEAD WEIGHT.			
1897.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
January	53 9	71 8	68 3	39 6
February	53 2	79 3	68 10	38 11
March	51 11	75 7	69 10	44 2
April	54 3	76 11	71 2	45 2
May	56 2	74 6	68 10	43 4

NOTE.—The above prices have been compiled from the weekly returns published in the *Journal d'Agriculture pratique.*

CHICAGO.

PRICES of CATTLE at CHICAGO per Cwt. (Live Weight) in the under-mentioned months of 1897.

Months.	Good Dressed Beef and Shipping Steers.	Export Cattle.	Extra Prime Cattle.
1897.	*s. d.* to *s. d.*	*s. d.* to *s. d.*	*s. d.* to *s. d.*
January - -	18 8 to 23 4	19 4 to 24 9	23 10 to 26 2
February - -	18 8 ,, 23 10	20 1 ,, 24 9	24 0 ,, 26 4
March - -	19 10 ,, 24 3	21 0 ,, 24 9	25 2 ,, 26 4
April - -	19 4 ,, 24 3	20 9 ,, 24 9	24 6 ,, 26 4
May - -	19 2 ,, 23 10	20 1 ,, 24 9	23 10 ,, 26 2

Compiled from the Live Stock Reports issued by Messrs. Clay, Robinson, and Co. of the Union Stock Yards, Chicago, Illinois.

AVERAGE VALUES, per Cwt., of various Kinds of DEAD MEAT Imported into the United Kingdom from FOREIGN COUNTRIES and BRITISH POSSESSIONS in the under-mentioned Quarters of 1896 and 1897.

(*Computed from the Trade and Navigation Accounts.*)

PERIOD.	BEEF.		MUTTON.	PORK.		BACON.	HAMS.
	Fresh.	Salted.	Fresh.	Fresh.	Salted.		
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
1st Quarter 1896 -	37 7	26 0	33 2	45 7	25 11	33 3	41 9
2nd Quarter ,, -	38 7	24 10	32 6	46 5	21 6	35 1	41 6
3rd Quarter ,, -	38 5	23 6	33 7	47 0	20 5	34 5	43 1
4th Quarter ,, -	36 11	23 8	31 3	45 7	22 10	35 6	45 7
1st Quarter 1897 -	39 4	25 9	27 4	44 11	23 4	33 5	41 9

AVERAGE PRICES of **British Corn** per Quarter of 8 imperial bushels,* computed from the Weekly Averages of Corn Returns from the 196 Returning Markets of ENGLAND AND WALES, pursuant to the Corn Returns Act, 1882, together with the QUANTITIES returned as sold at such Markets, in the under-noted periods of the Years 1897, 1896, and 1895.

QUARTER ENDED	PRICES.			QUANTITIES.		
	1897.	1896.	1895.	1897.	1896.	1895.
Wheat.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day -	29 7	25 8	20 1	619,679	448,047	652,874
Midsummer -	—	25 2	23 1	—	384,559	496,615
Michaelmas -	—	23 7	23 11	—	505,988	361,223
Christmas -	—	30 5	25 1	—	772,427	417,671
Barley.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day -	24 0	22 5	21 6	784,713	955,902	1,035,588
Midsummer -	—	21 4	20 3	—	92,739	79,936
Michaelmas -	—	21 0	21 3	—	165,722	141,985
Christmas -	—	27 1	24 10	—	2,177,499	2,169,067
Oats.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day -	16 4	13 9	13 9	194,193	259,565	250,838
Midsummer -	—	14 3	15 2	—	99,672	111,424
Michaelmas -	—	14 6	15 1	—	94,383	88,312
Christmas -	—	16 7	13 10	—	201,533	215,365

* Section 8 of the Corn Returns Act, 1882, provides that where returns of purchases of British Corn are made to the local inspector of Corn Returns in any other measure than the imperial bushel or by weight or by a weighed measure, that officer shall convert such returns into the imperial bushel, and in the case of weight or weighed measure the conversion is to be made at the rate of 60 imperial pounds for every bushel of wheat, 50 imperial pounds for every bushel of barley, and 39 imperial pounds for every bushel of oats.

AVERAGE PRICES of **British Corn**, per Quarter of 8 imperial bushels, computed from the Returns received under the Corn Returns Act, 1882, in each of the under-mentioned Weeks in 1897, and in the corresponding Weeks in 1896 and 1895.

Weeks ended *(in 1897.)*	Wheat.			Barley.			Oats.		
	1897.	1896.	1895.	1897.	1896.	1895.	1897.	1896.	1895.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Jan. 2	30 6	25 2	20 4	24 8	24 7	21 5	16 2	13 10	14 2
,, 9	31 1	25 4	20 8	25 5	23 11	21 3	16 3	13 9	13 9
,, 16	31 8	25 10	20 8	24 10	23 6	21 8	16 5	13 11	14 0
,, 23	31 7	26 1	20 9	25 5	23 7	21 11	16 6	13 10	13 10
,, 30	31 3	26 3	20 6	24 7	23 1	21 5	16 8	14 1	13 10
Feb. 6	30 7	26 4	19 11	24 10	22 5	21 8	16 7	14 0	13 6
,, 13	29 8	26 7	19 10	24 8	21 11	21 10	16 6	14 0	13 8
,, 20	28 11	26 3	19 10	23 9	21 10	22 2	16 5	13 9	13 9
,, 27	28 2	25 6	19 10	23 8	21 10	21 9	16 3	13 10	14 0
Mar. 6	28 3	25 4	19 9	23 0	21 5	21 6	16 3	13 8	13 9
,, 13	27 11	25 5	19 9	22 11	21 3	21 7	16 2	13 10	13 8
,, 20	27 11	25 1	20 0	22 8	21 1	20 10	16 2	13 9	13 10
,, 27	27 9	24 10	20 3	22 5	21 4	20 10	16 3	13 4	14 0
Apl. 3	27 10	24 7	20 4	22 3	21 10	20 11	16 3	13 3	14 5
,, 10	27 8	24 6	20 4	22 7	21 0	21 3	16 6	13 1	13 11
,, 17	27 0	24 11	20 6	23 0	23 6	21 2	16 3	14 0	14 5
,, 24	26 6	25 6	20 9	20 7	21 0	20 8	16 7	13 11	14 2
May 1	27 9	25 8	21 4	20 5	22 6	20 5	17 3	14 3	14 8
,, 8	28 4	25 7	22 4	21 5	21 0	20 8	16 11	14 4	15 3
,, 15	27 11	25 7	22 10	20 2	21 0	20 6	17 7	14 5	15 3
,, 22	28 1	25 6	23 5	19 10	21 8	20 1	17 9	14 6	15 9
,, 29	28 2	25 4	24 5	21 3	21 5	19 4	17 10	14 10	15 10
June 5	27 10	25 5	25 9	20 8	21 6	19 9	17 9	14 8	15 10
,, 12	27 4	25 1	26 2	22 8	19 3	19 4	17 11	14 9	15 11

AVERAGE VALUE per IMPERIAL QUARTER of WHEAT IMPORTED into the UNITED KINGDOM from the under-mentioned Foreign Countries and British Possessions in the Fourth Quarter of 1896 and in the First Quarter of 1897.

COUNTRIES from which Exported.	Average Value per Imperial Quarter.	
	Fourth Quarter, 1896.	First Quarter. 1897.
	s. *d.*	*s.* *d.*
ARGENTINE REPUBLIC - - -	27 6	30 2
CHILE - - - - - -	27 9	28 7
ROUMANIA - - - - -	29 6	30 8
RUSSIA - - - - - -	30 5	30 2
TURKEY - - - - - -	30 0	29 7
U.S. OF AMERICA { Atlantic - -	30 11	30 9
U.S. OF AMERICA { Pacific - -	33 6	31 1
INDIA, BRITISH - - - -	31 5	29 11
NORTH AMERICA, BRITISH - -	29 2	30 1

AVERAGE PRICES of WHEAT, BARLEY and OATS per IMPERIAL QUARTER in BELGIUM, FRANCE, and ENGLAND and WALES in the under-mentioned months of 1897.

MONTH.	BELGIUM.	FRANCE.	ENGLAND.
	WHEAT.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
February - - - - - -	29 2	36 0	29 4
March - - - - - -	—	36 5	27 11
April - - - - - -	—	36 6	27 3
May - - - - - -	—	37 0	28 0
	BARLEY.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
February - - - - - -	20 11	22 0	24 2
March - - - - - -	—	21 10	22 9
April - - - - - -	—	21 8	22 1
May - - - - - -	—	21 9	20 7
	OATS.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
February - - - - - -	18 2	17 10	16 5
March - - - - - -	—	17 9	16 2
April - - - - - -	—	17 9	16 4
May - - - - - -	—	17 10	17 5

Note.—The prices of Belgian grain are the official monthly averages published in the *Moniteur Belge*. The prices of French grain have been compiled from the official weekly averages published in the *Journal d'Agriculture pratique*. The prices of British grain are official averages based on the weekly returns furnished under the Corn Returns Act, 1882.

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER at the under-mentioned Markets in the under-mentioned months of 1897.

Month.	London.	Paris.	Breslau.
WHEAT.			
1897.	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d. s. d.
January - - -	33 0	35 8	35 8 to 37 5
February - - -	29 11	36 5	34 11 ,, 36 8
March - - - -	29 2	36 10	34 7 ,, 36 4
April - - - -	28 0	36 9	34 2 ,, 35 11
May - - - -	28 4	37 5	33 3 ,, 36 1
BARLEY.			
1897.	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d. s. d.
January - - -	24 10	21 10	20 5 to 27 9
February - - -	22 0	21 5	20 1 ,, 27 8
March - - - -	24 6	20 2	20 0 ,, 27 8
April - - - -	23 11	19 9	20 0 ,, 27 8
May - - - -	23 6	20 11	18 4 ,, 26 4
OATS.			
1897.	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d. s. d.
January - - -	17 6	17 10	15 10 to 18 8
February - - -	16 11	18 1	15 11 ,, 18 9
March - - - -	16 10	17 8	15 11 ,, 18 9
April - - - -	17 4	17 3	15 11 ,, 18 9
May - - - -	17 11	17 11	16 3 ,, 19 1

Note.—The London quotation represents the price of British corn as returned under the Corn Returns Act, 1882; the price of grain in Paris is the official average price of French wheat in that city; the quotations shown for Breslau represent the prices of grain of good merchantable quality.

MEAN WHOLESALE PRICES of BUTTER, MARGARINE, and CHEESE, in the under-mentioned months of 1897.

(Compiled from the *Grocer*.)

DESCRIPTION.	March.	April.	May.
	Per Cwt.	Per Cwt.	Per Cwt.
	s. d. s. d.	s. d. s. d.	s. d. s. d.
BUTTER:			
Cork, 1sts	107 0 —	91 0 —	81 0 —
,, 2nds	94 0 —	80 0 —	76 0 —
,, 3rds	85 0 —	74 0 —	72 0 —
,, 4ths	67 0 —	62 0 —	64 0 —
Friesland	84 0 to 87 0	81 0 to 85 0	77 0 to 80 0
Dutch Factories	87 0 ,, 91 0	85 0 ,, 89 0	77 0 ,, 84 0
French Baskets	105 0 ,, 115 0	99 0 ,, 106 0	94 0 ,, 100 0
,, Crocks and Firkins	95 0 ,, 100 0	89 0 ,, 95 0	85 0 ,, 92 0
,, 2nds and 3rds	82 0 ,, 91 0	79 0 ,, 89 0	74 0 ,, 82 0
Danish and Swedish	103 0 ,, 107 0	97 0 ,, 101 0	91 0 ,, 95 0
Finnish	83 0 ,, 99 0	80 0 ,, 91 0	77 0 ,, 86 0
Russian	79 0 ,, 95 0	78 0 ,, 89 0	76 0 ,, 84 0
Australian	76 0 ,, 93 0	67 0 ,, 93 0	64 0 ,, 92 0
New Zealand	66 0 ,, 91 0	60 0 ,, 91 0	56 0 ,, 90 0
Canadian and States	54 0 ,, 83 0	50 0 ,, 78 0	— —
Argentine	83 0 ,, 93 0	98 0 ,, 102 0	83 0 ,, 93 0
Fresh Rolls (Foreign) per doz.	9 6 ,, 15 0	9 6 ,, 13 0	9 0 ,, 13 0
MARGARINE:			
Margarine	24 0 ,, 54 0	24 0 ,, 54 0	24 0 ,, 51 0
Mixtures	46 0 ,, 72 0	46 0 ,, 70 0	46 0 ,, 70 0
CHEESE:			
Cheddar	64 0 ,, 82 0	64 0 ,, 82 0	64 0 ,, 80 0
Somerset	66 0 ,, 74 0	66 0 ,, 74 0	68 0 ,, 74 0
Cheshire	79 0 ,, 86 0	78 0 ,, 86 0	— —
Wiltshire	69 0 ,, 74 0	70 0 ,, 76 0	70 0 ,, 76 0
Double Gloucester	67 0 ,, 73 0	70 0 ,, 74 0	68 0 ,, 75 0

WEEKLY PRICES (WHOLESALE) of VEGETABLES and FRUIT at COVENT GARDEN MARKET.

(Compiled from the *Gardeners' Chronicle*.)

	Week ending			
	6th May.	13th May.	20th May.	27th May.
VEGETABLES—	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.
Artichokes, Globe, per dozen	2 0 to 2 6	2 0 to 2 6	3 0 to 3 6	3 0 to 3 6
Asparagus, Worcester, per bundle	1 6 ,, 1 9	1 6 ,, 1 9	1 6 ,, 2 0	1 6 ,, 2 0
Beans, French, per lb.	0 8 ,, 0 9	0 10 ,, 1 0	1 0 ,, 1 3	0 10 ,, 1 0
Cucumbers, home-grown selected, per dozen	2 6 ,, 3 0	2 6 ,, 3 0	2 6 ,, 3 0	2 6 ,, 3 0
Cucumbers, seconds, per dozen	1 9 ,, 2 0	1 6 ,, 2 0	1 6 ,, 2 0	1 6 ,, 2 0
Horseradish, English, per bundle	2 0 —	2 0 —	2 0 —	2 0 —
Mushrooms, Indoor, per lb.	0 8 ,, 0 9	0 8 ,, 0 9	0 8 ,, 0 9	0 8 ,, 0 9
Peas, Ordinary (Channel Islands), per lb.	0 6 —	0 6 —	0 6 —	0 6 —
Peas, Telephones, Channel Islands, per lb.	0 8 ,, 0 9	0 8 ,, 0 9	0 9 ,, 0 10	0 9 ,, 0 10
Potatoes—				
Dunbar Maincrop, per ton	80 0 ,, 90 0	80 0 ,, 90 0	100 0 —	100 0 ,,105 0
,, Saxons, per ton	70 0 ,, 75 0	70 0 ,, 75 0	75 0 ,, 80 0	70 0 ,, 75 0
Lincoln Giants, per ton	50 0 ,, 60 0	50 0 ,, 60 0	50 0 ,, 60 0	45 0 ,, 55 0
Jersey, New, per cwt.	24 0 ,, 30 0	17 0 ,, 20 0	14 0 ,, 16 0	12 0 ,, 13 0
Tomatoes, selected, smooth	0 10 ,, 1 0	0 10 ,, 1 0	0 9 ,, 1 0	0 7 ,, 0 8
,, Channel Islands per lb.	0 8 ,, 0 9	0 8 ,, 0 9	0 6 ,, 0 7	0 5 ,, 0 6
FRUIT—				
Apples, N.S. Wales, selected samples	9 0 ,, 10 0	9 0 ,, 10 0	10 0 ,, 14 0	10 0 ,, 14 0
Apples, N.S. Wales, ordinary samples	7 0 ,, 8 0	7 0 ,, 8 0	7 0 ,, 8 0	7 0 ,, 8 0
Apples, Tasmanian, selected samples, per case	8 0 ,, 9 0	8 0 ,, 9 0	8 0 ,, 9 0	8 0 ,, 9 0
Apples, Tasmanian, ordinary samples, per case	5 0 ,, 6 0	5 0 ,, 6 0	5 0 ,, 6 0	5 0 ,, 6 0
Figs, per dozen	4 0 ,, 6 0	2 0 ,, 4 0	2 0 ,, 4 0	2 0 ,, 4 0
Grapes, Hamburghs, per lb.	2 6 ,, 3 0	2 6 ,, 3 0	2 6 ,, 3 0	2 6 ,, 3 0
,, Belgian per lb.	2 0 ,, 2 6	1 3 ,, 1 6	1 3 ,, 1 6	1 3 ,, 1 6
Melons, Channel Islands, each	1 0 ,, 2 0	1 0 ,, 2 0	1 0 ,, 1 6	1 0 ,, 1 6
Peaches, selected, per dozen	10 0 ,, 12 0	10 0 ,, 12 0	10 0 ,, 12 0	12 0 ,, 17 0
,, medium, per dozen	6 0 ,, 8 0	4 0 ,, 6 0	4 0 ,, 6 0	6 0 ,, 8 0
,, seconds, per dozen	3 0 ,, 4 0	2 6 ,, 3 0	2 6 ,, 3 0	2 6 ,, 3 0
Pineapples, St. Michael, each	4 0 ,, 7 6	4 0 ,, 7 6	4 0 ,, 7 6	4 0 ,, 7 6
Strawberries, morning gathered per lb.	3 6 ,, 4 0	3 6 ,, 4 6	3 6 ,, 5 0	3 6 ,, 4 6
Strawberries, in boxes, per lb.	1 0 ,, 1 6	1 0 ,, 1 6	1 0 ,, 1 6	1 0 ,, 1 6
,, seconds, per lb.	1 6 ,, 2 0	1 6 ,, 2 0	1 6 ,, 2 0	1 6 ,, 2 0

AVERAGE PRICES OF ENGLISH WOOL, per sack of 240 lbs., in the undermentioned months of 1897.

(Compiled from the *Economist.*)

DESCRIPTION.	MARCH.	APRIL.	MAY.
	£ s. to £ s.	£ s. to £ s.	£ s. to £ s.
South Down - - -	9 0 to 11 0	9 0 to 11 0	9 0 to 11 0
Half breds - - -	9 0 ,, 10 0	9 0 ,, 10 0	9 0 ,, 10 0
Leicester - - - -	9 0 ,, 10 2	9 0 ,, 10 0	9 0 ,, 10 0
Kent Flee·es - - -	9 0 ,, 10 0	9 0 ,, 10 0	9 0 ,, 10 0

DISEASES OF ANIMALS IN GREAT BRITAIN.

NUMBER of OUTBREAKS of **Pleuro-Pneumonia**, and of **Swine-Fever**, with the Number of CATTLE and SWINE Slaughtered by order of the Board of Agriculture, in Great Britain in each of the under-mentioned periods.

QUARTER ENDED.	**Pleuro-Pneumonia.**			**Swine-Fever.**	
	OUTBREAKS Confirmed.	CATTLE found Diseased.	CATTLE Slaughtered as having been exposed to Infection.	OUTBREAKS Confirmed.	SWINE Slaughtered as Diseased, or as having been exposed to Infection.
	No.	*No.*	*No.*	*No.*	*No.*
December 1895 -	—	—	—	1,787	26,958
March 1896 - -	1	8	78	1,524	19,596
June 1896 - -	1	1	105	1,723	24,855
September 1896 -	—	—	—	1,104	19,329
December 1896 -	—	—	—	815	15,806
March 1897 -	2	14	450	785	13,544

NUMBER of OUTBREAKS reported as having taken place, and Number of ANIMALS returned as having been ATTACKED by ANTHRAX, GLANDERS, and RABIES in Great Britain in each of the under-mentioned periods.

QUARTER ENDED.	**Anthrax.**		**Glanders** (including **Farcy**).		**Rabies.**	
	OUTBREAKS REPORTED.	ANIMALS ATTACKED.	OUTBREAKS REPORTED.	ANIMALS ATTACKED.	CASES REPORTED.	
					DOGS.	OTHER ANIMALS.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
December 1895	115	201	197	359	134	9
March 1896 -	156	266	193	321	200	10
June 1896 -	106	214	177	303	127	11
September 1896	108	205	234	339	66	—
December 1896	118	219	213	331	45	1
March 1897 -	130	310	190	324	53	10

DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of **Pleuro-Pneumonia** and of **Swine-Fever,** with the number of CATTLE and SWINE slaughtered by order of the Lord Lieutenant and Privy Council in Ireland, in each of the under-mentioned periods.

QUARTER ENDED	**Pleuro-Pneumonia.**			**Swine-Fever.**	
	OUTBREAKS Confirmed.	CATTLE found Diseased.	CATTLE Slaughtered as having been exposed to Infection.	OUTBREAKS Confirmed.	SWINE Slaughtered as Diseased or as having been exposed to Infection.
	No.	*No.*	*No.*	*No.*	*No.*
December 1895 -	—	—	—	165	625
March 1896 - -	—	—	—	267	1,508
June 1896 - -	—	—	—	241	1,614
September 1896 -	—	—	—	162	850
December 1896 -	—	—	—	60	2,794
March 1897 - -	—	—	142	122	1,149

NUMBER of OUTBREAKS reported as having taken place, and Number of ANIMALS returned as having been ATTACKED by ANTHRAX, GLANDERS, and RABIES in Ireland in each of the under-mentioned periods.

QUARTER ENDED	Anthrax.		Glanders (including Farcy).		Rabies.	
					Cases Reported.	
	Out-breaks Reported.	Animals Attacked.	Out-breaks Reported.	Animals Attacked.	Dogs.	Other Animals.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
Dec. 1895 -	—	—	—	—	101	37
March 1896 -	—	—	4	6	156	33
June 1896 -	1	1	—	—	150	86
Sept. 1896 -	—	—	3	4	114	50
Dec. 1896 -	—	—	—	1	74	29
March 1897 -	—	—	—	—	118	19

POST OFFICE SAVINGS BANKS, WITH GOVERNMENT SECURITY.

ADVANTAGES TO DEPOSITORS.

SECURITY. The Post Office Savings Banks are established by Act of Parliament, and every depositor has the *direct security* of the State for the repayment of his deposits.

DEPOSITS. Any sum from a shilling upwards, excluding pence, may be deposited at one time, and any number of deposits may be made in the course of a year (ending December 31st) up to a limit of 50*l.* A person may have 200*l.* in all on his deposit account, including interest.

WITHDRAWALS can be made with the utmost promptitude by sending notice by post to the London Chief Office on the form provided for the purpose, which is obtainable at any Post Office Savings Bank, and payment can be received at any Post Office Savings Bank in the United Kingdom

convenient to the depositor without regard to the office of deposit. During any year ending 31st December, a depositor may replace the amount of any one withdrawal previously made in the same year.

INTEREST at the rate of 2*l.* 10*s.* per cent. per annum is allowed on every complete pound deposited, so long as the sum to a depositor's credit does not exceed 200*l.* Whenever the balance exceeds that sum interest will be allowed on 200*l.* and the excess will be invested for the depositor in Government Stock unless the depositor should otherwise direct.

TRANSFER FROM A TRUSTEE SAVINGS BANK. If a depositor in a Trustee Savings Bank wishes to place his money in a Post Office Savings Bank, he should apply to the Trustees of the Savings Bank for a Certificate of Transfer (in the form prescribed by the 10th section of the Act 24 Vict., c. 14), and should pay the certificate into any Post Office Savings Bank as if it were a cheque. By adopting this course, the depositor will avoid trouble and the risk of carrying cash from one bank to the other.

DEPOSITOR'S BOOK CAN BE USED AT ANY POST OFFICE SAVINGS BANK. A depositor may add to his deposits, or withdraw the whole or any part of them, at any Post Office Savings Bank in the United Kingdom, without change of deposit book.

NOMINATIONS. A depositor of the age of sixteen years, or upwards, may, subject to certain limits, nominate any person to receive his Savings Bank deposits at death. A form for the purpose may be obtained, free of cost, from the Controller of the Savings Bank Department.

SECRECY. The strictest secrecy is observed with respect to the names and addresses of depositors in Post Office Savings Banks, and the amounts deposited or withdrawn by them.

POSTAGE FREE. No charge for postage is made to a depositor, if in the United Kingdom, for any letter passing between him and the Chief Office on Post Office Savings Bank business.

LIST OF LEAFLETS ISSUED BY THE BOARD OF AGRICULTURE.

Number.	Title.
Leaflet No. 1	Mites on Currant and Nut Trees.
,, ,, 2	Vine and Raspberry Weevils.
,, ,, 3	The Turnip Fly or Flea.
,, ,, 4	Caterpillars on Fruit Trees.
,, ,, 5	The Mangel Wurzel Fly.
,, ,, 6	The Field Vole.
,, ,, 7	Autumn Catch Crops and Fodder Supply.
,, ,, 8	Farmers and Assessments to Local Rates.
,, ,, 9	Ensilage.
,, ,, 10	Wireworms.
,, ,, 11	The Daddy Longlegs.
,, ,, 12	The Gooseberry Saw-Fly.
,, ,, 13	Acorn Poisoning.
,, ,, 14	The Raspberry Moth.
,, ,, 15	The Apple Blossom Weevil.
,, ,, 16	The Apple Sucker.
,, ,, 17	Preservation of Commons.
,, ,, 18	Fertilisers and Feedings Stuffs Act, 1893.
,, ,, 19	Pea and Bean Weevil.
,, ,, 20	The Magpie Moth.
,, ,, 21	The Warble Fly.
,, ,, 22	The Diamond Back Moth.
,, ,, 23	Potato Disease.
,, ,, 24	The Ribbon Footed Corn-Fly.
,, ,, 25	The Cockchafer.
,, ,, 26	Farmers and the Income Tax.
,, ,, 27	Remission of Tithe Rentcharge.
,, ,, 28	Anthrax.
,, ,, 29	Swine Fever.
,, ,, 30	The Codlin Moth.
,, ,, 31	The Onion Fly.
,, ,, 32	Foul Brood or Bee Pest.
,, ,, 33	Surface Caterpillars.
,, ,, 34	The Woolly Aphis or American Blight.
,, ,, 35	The Celery Fly.
,, ,, 36	Cultivation of Osiers.
,, ,, 37	Rabies.
,, ,, 38	The Carrot Fly.

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BRITISH MUSEUM
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The Journal

OF THE

BOARD OF AGRICULTURE

SEPTEMBER, 1897.

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THE JOURNAL

OF THE

BOARD OF AGRICULTURE.

Vol. IV. No. 2. SEPTEMBER, 1897.

THE STORAGE OF FARMYARD MANURE.

Although this substance has been used from time immemorial, and is still to a greater or less extent employed on nearly every farm, it is surprising how little is accurately known regarding the chemical and biological changes that occur in a mass during storage, or even after it has been applied to the land. The views of farmers vary greatly as to the manner in which this form of manure should be treated or handled so as to turn out a fertilising substance that will produce the maximum effect on the crops to which it may be applied. Some farmers endeavour to consolidate their manure heaps by carting over them or by applying other forms of pressure, while others, by frequent turning of the mass, try to keep the substance as loose as possible, so as to facilitate the entrance of air. Water is supplied by some and excluded by others, and conservation agents are variously regarded as a necessity or a superfluity. While one farmer believes in "fresh" manure, another prefers it rotten; and the same divergence of view is met with in the matter of autumn and spring application. In many other respects, too, one fails to find uniformity of practice, for whereas it may be the prevailing local custom in one district to give all the fold manure to the roots, along with a liberal allowance of artificials, it may be the general practice in another county to reserve the whole of the dung for the wheat crop, and to supplement it with no artificials whatever. No doubt variations in soil, climate, rotations, tillages, and character of the manure are sufficient, in some cases, to account for differences in practice, though it must be admitted that broad general

principles prevail throughout that make it impossible altogether to reconcile the divergent methods of treatment which one so frequently encounters.

Even in Germany, the home of scientific research, one fails to find more agreement amongst scientists and farmers on this particular point than in this country, and this is doubtless the reason that has induced the Deutsche Landwirthschaftliche Gesellschaft, in co-operation with the Experimental Stations of Augsburg, Bonn, Darmstadt, Göttingen, Jena, and Rostock, to take up the subject, in which much valuable work has been done during the past four years.

König, Kühn, Holdefleiss and others had, previous to the present decade, carried out a certain number of experiments on the conservation of farmyard manure; but it was felt that it would be better in the present instance to ignore all previous work, and to start absolutely *ab initio*. Although this would appear to be a somewhat drastic method of procedure it has much to commend it, and the interim reports display a logical sequence in methods and results that could not have been obtained in any other way. These reports are to be found partly in the Year Books of the stations concerned, partly in "Die Landwirthschaftliche Versuchs-Stationen," and partly in the form of independent brochures; and although they contain much of the highest value to agriculture, the stage of the inquiry that has been reached may be gathered from the words in which Dr. Wagner concludes an account of his work up to the year 1896:—"What I say is this, that our investigations during the past few years form no more than a solid foundation for further progress."

The matter that has so far claimed most attention is the changes and losses that occur in the nitrogen of farmyard manure during the period of storage, but attention may, in the present instance, be given to the effect of different methods of treatment on the disappearance of organic matter, and, incidentally, on the temperature of masses of manure.

The investigation of farmyard manure presents many difficulties, one of which is intimately associated with the great mass of material that has to be dealt with in actual farm practice. In order to obviate this difficulty as far as possible,

certain of the investigators, such as Maercker, Schultze, Dietzell, Pfeiffer, Franke, Gotze, and Thurmann, confined their attention, largely or exclusively, to laboratory experiments, using for this purpose from two to twenty pounds of material which was operated upon in glass flasks, metal cylinders, or similar receptacles. On the whole, such experiments cannot be relied upon to furnish results which are capable of application in actual practice, for it is evident that fermentation and other changes must proceed in large masses of manure in a way that is very different, at least in degree, to what takes place in a few pounds of material. For certain purposes such experiments are no doubt useful, though they must certainly be repeated on a more practical scale before farmers can with confidence be advised to accept the results they may furnish.

An experiment of this type, conducted by Maercker and Schultze, may be described. The manure employed consisted of ½kg. of solid and 1·75kg. of liquid fæces of the cow, to which was added ½kg. of moss litter. This material was placed in a series of flasks which received the substances indicated in the table, samples for analysis being drawn at the end of 16, 36, 57, 161, and 310 days. As a result it was found that all the agents had more or less effect in preventing loss of organic matter, even lime, which is generally supposed to hasten decay, agreeing with the others in this respect.

	Percentage Loss of Organic Matter at the End of				
	16 Days.	36 Days.	57 Days.	161 Days.	310 Days.
Manure with nothing added	2·21	4·42	6·48	16·40	29·88
,, + 1·875 g. Phosphoric acid in the form of Superphosphate	0·84	1·31	2·07	2·11	6·88
,, + 7·5 g. Phosp. acid	0·93	1·58	2·66	1·62	8·65
,, + 0·5 g. Hydrofluoric acid in the form of Potassium Fluoride	0·78	1·24	2·03	5·65	14·50
,, + 2·5 g. Hydrofl. acid	3·37	5·50	7·21	10·61	13·95
,, + 11·25 g. Sulphuric acid	0·89	1·84	2·83	6·73	12·90
,, + 22·50 g. ,, ,,	1·06	1·73	3·07	6·84	11·32
,, + 56·20 g. Caustic Lime	0·00	0·39	1·42	4·04	9·05

Dietzell conducted an experiment with about 2kg. of ox fæces, plus 10 per cent. of chaffed straw, the material being placed in flasks provided, in one case, with glass tubes reaching to the bottom and attached to a respiration apparatus, so that the manure was constantly subjected to the influence of a current of air; while in the other set, air was not artificially drawn through the mass. The experiment was conducted in a room, the temperature of which varied between 10·5 deg. C. and 25 deg. C., and lasted from July 5th, 1893, to January 30th, 1894. From time to time water was added, so that the material was constantly kept in a moist condition. The percentage loss of dry organic matter is shown in the accompanying table:—

	Per cent. of dry matter lost.	
	Without artificial air circulation.	With artificial air circulation.
Manure + nothing	1·04	45·93
,, + 2 % kainit	0·95	31·15
,, + 3 % gypsum	6·29	37·85
,, + 0·38 % sol. phosp. acid in superphosphate	0·00	39·49
,, + 0·23 % citrate sol. phosp. acid in precipitated phosphate	5·44	41·07

In this case the agents employed tended to prevent loss of organic matter only where the manure was constantly and thoroughly aerated; while oxidation was—as was to be expected—much more energetic under these conditions than where the mass was not subjected to artificial aeration.

In a series of experiments, Pfeiffer placed 2kg. of ordinary manure in a set of flasks, and by means of suitable apparatus secured air-circulation *over* the mass in one case and *through* the mass in the other. The result was that at the end of ten months there was practically as much loss of organic matter in the one case as the other.

In another series of experiments he placed 7kg. of manure —consisting of a mixture of solid and liquid bovine excreta and moss litter—in each of a set of zinc cylinders, the manure in one case being loosened every eighth day, while

in the other case it was kept firmly compressed. At the end of five months it was found that the loosened substance had lost 31·47 per cent. of dry organic matter, while the compressed material had lost only 26·8 per cent., the difference being due, no doubt, to variation in the degree of aeration.

Pfeiffer also experimented with the following conservation agents in the proportions indicated—Gypsum, 3 per cent.; double Superphosphate, 1 per cent.; and Precipitated Phosphate, 1 per cent.—but on the average of the different methods of air-circulation *over* and *through* the mass, and of loosened and compressed manure, the loss of organic matter was practically the same with and without the application of these substances.

Wagner, using 40kg. of horse dung, which was contained in metal cylinders, freely exposed to the air, found that the loss of organic matter was not appreciably influenced in eight months by the application of the ordinary so-called conservation agents, the variation being only 2 per cent., ranging as it did between 24 and 26 per cent. After a further period of storage of sixteen months the variation was still only 2 per cent., the limits in this case being 56 and 58 per cent. He also tested the influence of compression on the dung, and found that at the end of two years the manure that had been periodically loosened had lost 46½ per cent. of dry matter, while the loss in the case of that which was less thoroughly aerated was 39 per cent. The same experiment was carried out in a series of cemented pits, each of which received 700kg, (about 14cwt.) of horse manure, and again it was found that at the end of four months ordinary agents (gypsum, soluble phosphate, and kainit) had no effect, the loss of dry matter varying between the limits of 16 and 18 per cent.

Wagner also carried out a series of experiments with 10—14cwt. of horse manure, which was placed in cemented pits, and kept in the following three conditions : (*a*) firm and moist, (*b*) loose and moist, (*c*) loose and dry. At the end of four months it was found that on the average the "firm" manure had lost 16 per cent. of dry matter, while that which was kept "loose" had lost 39 per cent. The conservation agents had no effect where the manure was kept firm, but under opposite con-

ditions they had an appreciable influence in retarding oxidation, thus:—Manure + nothing lost 44 per cent. of dry matter; manure + 3 per cent. gypsum lost 38 per cent. of dry matter; manure + 3 per cent. gypsum + 0·3 per cent. sol: phosp: acid lost 37 per cent. of dry matter; manure + 2 per cent. kainit lost 34 per cent. of dry matter.

Periodic applications of water, so that the mass was kept thoroughly moist, had no influence on the disappearance of organic matter.

The temperature of the manure was determined at frequent intervals, and the readings agree closely with the extent of the disappearance of organic matter. Thus, the temperature of the pits containing firm manure fluctuated only between 30 deg. and 36 deg. C., whereas the manure that was loose varied in temperature between 23 deg. C. and 57 deg. Graphically represented, the temperature-readings in the one case give a very gently-curved line; whereas, in the other, the line is jagged, the sudden rises in temperature following the periodic turnings of the manure. It was only in the last few weeks of the experiment that the temperature of the "loose" dung was lower than that of the "firm" material, when, evidently, the easily oxidised matter had so completely disappeared as to offer no opportunity for the action of the air, which was freely admitted at every turning.

In a further series of experiments these results were fully confirmed. Although *frequency of turning* (on every fifth, tenth, fifteenth, or twentieth day) had but little effect on the temperature of the mass or on the disappearance of organic matter—aeration evidently being practically as thorough when the manure was turned over every twentieth day as when turned every fifth—turning generally had the same effect as before. Thus, six weeks after starting the experiment the temperature of the dung that had not been turned was 23 deg. C., whereas it was 54 deg. C. in the mass that had been turned every twentieth day. Corresponding to these temperatures, we find at the end of five months a loss of organic matter of 20 per cent. where the manure was unturned, and of 51 per cent. where turning was effected

every twenty days. As before, the so-called conservation agents were practically without effect.

In still another set of experiments these results were again confirmed. After eleven months' storage the manure that had been frequently turned had lost 46 per cent. of dry matter, as against 27 per cent. where the mass had not been turned. The substances added were absolutely without effect where the manure was kept firm, and they had only a slight conservating influence in the better aerated mass.

Although it would be premature to draw practical conclusions from the results of these experiments, they certainly offer some definite information in regard to the behaviour of organic matter in manure during storage under varying conditions. It cannot yet, however, be confidently asserted that it is, in the main, either advantageous or the reverse to reduce the loss of organic matter to the minimum. Such manure will no doubt have a greater mechanical effect on land than that which has experienced greater fermentation, but although under certain circumstances this may be an advantage, there are possibly as many instances where the opposite would be the case. But apart altogether from the question of mechanical influence, there is the consideration of the behaviour of the nitrogen during storage, and beyond this again there is the question of the influence of the manure produced under varying conditions on the nitrogen of the soil, or of artificial manures that may be applied along with dung.

On one point the experiments furnish results that may apparently be accepted as final. None of the conservation agents usually employed appears to have any very important influence on the decomposition of farmyard manure, and it may be added that they are equally powerless to prevent the loss of nitrogen.

WILLIAM SOMERVILLE.

IMPORTS OF THE CEREAL YEAR.

The following statement, which has been compiled from the Trade and Navigation Returns, shows the quantities and values of the principal articles of agricultural produce imported into the United Kingdom during the cereal year which has just closed, together with the imports for the corresponding period of 1895-96. The chief changes in the import trade in the two periods compared may be briefly reviewed under the divisions of meat, dairy produce, and grain.

In the case of meat there was a noticeable reduction in the number of live sheep imported in the past cereal year, the entries having been fewer by over 312,000 head than in the preceding twelve months. This decline was mainly due to the smaller consignments from the United States and Canada, which were respectively 188,000 head and 121,000 head short of those of 1895-96. An increase of about 220,000 cwts. in the receipts of imported fresh mutton from Australasia, Argentina and Holland, compensated, however, for the diminution in the transatlantic shipments of live sheep. The supply of foreign beef, both on the hoof and dead, exceeded that of 1895-96, owing chiefly to the larger consignments of live cattle and fresh beef from Canada and the United States. To the latter country we are also indebted for an increase of 870,000 cwts. in the imports of bacon and hams.

The principal features in the imports of grain are the diminution shown in the supply of wheat and the continuation of the upward movement in the importation of maize, which has been a characteristic of our Trade Returns for some few years. The quantity of wheat and of wheat-meal and flour imported in the past year was equivalent to 21,660,000 quarters of grain, as compared with an importa-

tion of 22,509,000 quarters in 1895-96 and 24,872,000 quarters in 1894-95. Thus the consignments of foreign wheat have decreased to the extent of over three million quarters in the past three cereal years, and this is a fact which should not be overlooked in any consideration of the circumstances

ARTICLES.	1ST SEPT. 1895 TO 31ST AUG. 1896.		1ST SEPT. 1896 TO 31ST AUG. 1897.	
	Quantities.	Values.	Quantities.	Values.
		£		£
Horses - - - No.	42,110	1,070,120	46,190	1,166,559
Cattle - - - ,,	549,744	9,089,691	596,057	10,031,243
Sheep - - - ,,	1,008,215	1,585,349	695,943	1,021,421
Bacon - - - cwts.	4,309,950	7,745,408	4,931,846	8,612,983
Beef:				
Salted - - - ,,	244,791	311,712	203,212	245,280
Fresh - - - ,,	2,443,001	4,674,736	2,875,486	5,552,424
Hams - - - ,,	1,390,052	2,990,249	1,640,642	3,577,522
Meat unenumerated:				
Salted or fresh - ,,	256,249	513,978	330,225	656,693
Preserved, otherwise than by salting - ,,	776,047	1,885,833	705,212	1,777,627
Mutton, fresh - - ,,	2,865,290	4,833,010	3,083,063	4,687,118
Pork:				
Salted (not Hams) - ,,	244,803	280,690	249,917	272,294
Fresh - - - ,,	272,703	632,274	353,854	795,935
Rabbits - - - ,,	151,981	368,683	237,943	492,200
Corn:				
Wheat - - - ,,	68,793,090	19,667,452	65,017,490	22,475,628
Wheat Meal and flour ,,	19,926,370	8,330,939	20,023,305	9,537,371
Barley - - - ,,	22,008,672	5,378,942	21,696,370	5,454,167
Oats - - - ,,	15,125,190	3,505,208	18,382,610	4,575,620
Maize - - - ,,	44,459,940	8,518,228	59,726,120	10,113,417
Butter - - - ,,	2,951,153	14,984,858	3,188,918	15,940,599
Margarine - - ,,	930,536	2,512,116	956,881	2,555,163
Cheese - - - ,,	2,125,340	4,517,659	2,449,543	5,596,043
Milk, con. or pres. - ,,	582,560	1,133,400	709,124	1,334,015
,, and cream, fresh gallons	—	3,098	—	9,696
Eggs - - gt. hundreds	12,922,414	4,099,448	13,954,024	4,310,599
Fruit:				
Apples - - - bushels	2,968,275	858,226	7,178,789	1,834,527
Pears - - - ,,	456,830	195,238	761,349	285,474
Hops - - - - cwts.	213,156	582,415	160,887	508,334
Onions - - - bushels	5,853,094	657,462	6,379,321	778,090
Potatoes - - - cwts.	2,353,927	922,012	2,332,682	926,070
Tallow and Stearine - ,,	2,251,744	2,490,349	1,821,145	1,778,029
Wool - - - - lbs.	710,735,674	25,047,699	743,098,296	24,914,888
Hides, wet and dry - cwts.	938,499	2,197,079	1,161,896	2,670,028
Lard - - - - ,,	1,772,934	2,548,646	1,684,222	1,899,180
Poultry and Game -	—	640,959	—	611,637
Vegetables (unenumerated)	—	1,280,277	—	1,444,658
Hay - - - - tons	113,305	—	127,587	—
Straw - - - ,,	64,796	—	89,462	—

which have accompanied the improvement in the price of wheat. In this connection it is also worthy of note that during the same period our receipts of wheat from Argentina and Russia—two of our cheapest sources of

supply—have dropped from 8,634,000 quarters to 3,894,000 quarters, the fall being greatest in the case of the former country, which sent us 3,291,000 quarters in 1894-95, and only 304,000 quarters in the past cereal year. The wheat received in all forms from the United States amounted to 12,116,000 quarters in 1896-97, as compared with 10,528,000 quarters in 1894-95. The statistics of the imports of maize indicate that there has been a rapid growth in the demand for this grain in the past two years. In 1894-95 the quantity received was equivalent to 6,452,000 quarters; in the following twelve months 10,374,000 quarters were imported; and in the cereal year which has just closed the receipts amounted to 13,936,000 quarters.

As regards dairy produce, it will be seen that the imports of cheese and butter in 1896-97 exceeded those of the previous year by 324,000 cwts. and 238,000 cwts. respectively. The bulk of the increased supply of the former article was drawn from Canada; and Denmark, Australasia, and the United States were responsible for the augmented receipts of butter.

Among other articles which were imported in larger quantities in the past year than in 1895-96 were rabbits, milk, eggs, apples, pears, onions, wool, hay, straw, and hides. The greater part of the increase of 123,793,000 in the number of eggs imported was due to larger consignments from Russia, while Denmark and Canada also augmented their shipments of this article. A great development will be observed in the entries of apples, which amounted to over 7,000,000 bushels in 1896-97 as compared with 2,968,000 bushels in the preceding year.

Articles showing a decrease are hops, tallow and stearine, and lard.

CANADIAN AGRICULTURE.

Canada, which is the most extensive of all the British possessions, embraces an estimated area of over 3,300,000 square miles, exclusive of rivers and lakes, the land surface being nearly thirty times larger than the United Kingdom. Within this vast area are included the various provinces and districts of the mainland, Prince Edward Island, Vancouver, and groups of islands in the Arctic Ocean and Hudson Bay.* A large region in the northern division of the Dominion is from its physical characteristics unsuited to the pursuit of agriculture, and there is very little settled and cultivated land to the north of a line running eastward from the Rocky Mountains to the northern shores of Lake Winnipeg, and thence by the south of James Bay to the mouth of the St. Lawrence. The territory lying south of this line, omitting for the moment British Columbia, may be roughly divided into two regions: to the east of Lake Winnipeg stretches an immense area of woodland and forest, occupied by the older provinces of Ontario, Quebec, New Brunswick, Nova Scotia, and Prince Edward Island; to the west, up to the slopes of the Rocky Mountains, lies a large tract of prairie land, comprising within its limits the province of Manitoba, and the organized districts of Assiniboia, Saskatchewan, and Alberta.

On the cleared areas of the woodland region, particularly in Ontario and Quebec, farming is the most important industry.

---

* The land areas of the several provinces and districts are as follows, the figures representing square miles:—Ontario, 219,650; Quebec, 227,500; Nova Scotia, New Brunswick, and Prince Edward Island, 50,650; Manitoba, 64,066; British Columbia, including Vancouver, 382,300; North-west Territories, or Districts of Assiniboia, Saskatchewan, and Alberta, 294,280; Keewatin, 267,000; Athabasca, 103,300; unorganized Territories, 859,600; other Districts and Islands, 846,600.

According to the census returns of 1891, over three-fifths of the total surface returned as occupied for agricultural purposes in the Dominion was situated in these older provinces, and nearly half of the entire area of improved land (14,000,000 acres out of 28,500,000 acres) was accounted for by Ontario. West of the last-named province lie Manitoba and the three organised territories comprised within the prairie section, and there the natural conditions are favourable to the pursuit of all branches of agriculture; but the country is for the most part only sparsely settled and has yet to be developed. It has been estimated that Manitoba contains about 4,000,000 acres of some of the best wheat-growing land in the world; the area under all kinds of crops in the province does not, however, exceed two million acres, of which rather more than half is devoted to wheat. British Columbia has sometimes been represented as a "sea of mountains;" but agriculture is making great progress in this province, and the climate in the lower mainland and Vancouver is very favourable to dairying and fruit-growing.

The area of occupied land in the Dominion at the last census was sixty million acres, of which nearly half was returned as improved. This surface was distributed among the various provinces and islands as shown in the following statement:—

	Total Area Occupied.	Distribution of Occupied Area.			
		Crops.	Pasture.	Woodland and Forest.	Gardens and Orchards.
	Acres.	Acres.	Acres.	Acres.	Acres.
British Columbia	3,329,660	50,126	713,437	2,558,342	7,755
Manitoba	5,228,272	1,226,439	3,765,990	230,171	5,672
New Brunswick	4,471,250	1,018,704	479,607	2,961,460	11,479
Nova Scotia	6,080,695	969,548	994,113	4,086,998	30,036
Ontario	21,091,698	10,366,281	3,461,623	6,933,746	330,048
Prince Edward Island	1,214,248	536,175	178,072	496,156	3,845
Quebec	15,961,763	5,542,780	3,054,539	7,290,817	73,627
The Territories	2,910,144	194,773	2,637,407	75,964	2,000
Total	60,287,730	19,904,826	15,284,788	24,633,654	464,462

In 1891 agriculture maintained about 45 per cent. of the total population of Canada; the occupiers of land numbered 620,000, comprising 525,000 owners and 93,000 tenant farmers. At the same period the area under the principal cereal crops amounted to 7,700,000 acres, of which wheat covered 2,724,000 acres, barley, 881,000 acres, and oats 4,128,000 acres. Half of the surface sown with wheat and oats, and over two-thirds of that under barley, lay at that time in the province of Ontario. Manitoba ranked next in the production of the staple bread-cereal, and Quebec filled the second place as a producer of oats. The estimated aggregate yield of wheat in the Dominion in the census year was about 42,000,000 bushels, half of which was grown in Ontario and all but five million bushels of the remainder in Manitoba. Later statistics have not been collected for the whole of Canada, but in the two provinces just mentioned the acreage and produce of the principal crops are estimated annually, and from these estimates some idea may be gathered of the present position of farming in the country. Since 1890 the area under wheat in Ontario has declined by about 300,000 acres, but concurrently with this contraction there has been an expansion of over one hundred thousand acres in the Manitoban acreage, and apparently some extension in British Columbia.

One feature of Canadian agriculture has been the gradual movement of the centre of wheat cultivation towards the west. In the older settlements, east of Lake Winnipeg, a more diversified system of farming is gradually displacing cereals, with the exception of oats. Barley, which was formerly grown to a considerable extent in Ontario for export, occupies a steadily decreasing acreage, and hitherto the crop has not been cultivated on a large scale in any other province. Oats, on the other hand, continue to be grown on a larger surface yearly, both for home consumption and for exportation. In Manitoba and the south of the North-West Territories there is an immense tract of fine wheat-growing land, known as the Red River Valley, extending across the boundary into Dakota and Minnesota. The greater part of this region has yet to be brought under the plough, and

there can be little doubt that with the development of the means of transit, and with prices at a remunerative level in consuming countries, immense quantities of wheat could be raised for export in this part of the country. The circumstances of the past few years do not, however, appear to have encouraged Canadian farmers to continue to enlarge their wheat-fields. It is true that the yearly exports of grain from the Dominion have been on a greater scale since 1891 than at any previous period, but this has been due not to a progressive extension of the area cultivated after that year, but rather to a succession of abundant harvests beginning with 1891, when the yield per acre was exceptionally high both in the Dominion and the United States, and ending with 1895.*

In the older provinces of the Dominion stock-raising and dairying are already established industries, and in the opinion of several authorities there is a great future awaiting both these branches of farming in Manitoba and the North-West Territories, where a practically unlimited amount of natural pasture is a strong inducement to the keeping of live stock. The natural advantages that favour the development of these industries in Canada are, however, counterbalanced to some

* The average annual net exportation of wheat, in the form of grain and flour, from Canada in the five years 1891-95 amounted to 7,389,000 bushels, as compared with an average of 2,137,000 bushels in the preceding quinquennium. It will be seen from these figures that the exports have practically doubled within the last decade; but, as has been pointed out above, this is largely the result of a series of good harvests between 1891 and 1895. The acreage and production of wheat in the provinces of Ontario and Manitoba in each year since 1887 has been as follows:—

Year.	Ontario.		Manitoba.	
	Area.	Produce.	Area.	Produce.
	Acres.	Bushels.	Acres.	Bushels.
1887	1,383,000	20,074,000	432,000	12,352,000
1888	1,194,000	20,284,000	—	—
1889	1,221,000	18,700,000	623,000	7,202,000
1890	1,431,000	21,315,000	897,000	16,092,000
1891	1,361,000	32,584,000	917,000	23,192,000
1892	1,618,000	28,783,000	876,000	14,454,000
1893	1,271,000	21,731,000	1,004,000	15,616,000
1894	1,009,000	19,880,000	1,010,000	17,173,000
1895	967,000	17,628,000	1,140,000	31,775,000
1896	1,132,000	18,194,000	1,000,000	14,372,000

extent by the inclemency of the winter climate, which makes it necessary that cattle should be kept in the stalls for periods varying from six to eight months in each year. In some parts of Ontario and Quebec this difficulty has rendered feeding for meat unremunerative in recent years; but in the case of dairy herds attempts are being successfully made to meet the situation by the cultivation of cheap fodders for winter-keep, maize being largely used for this purpose and fed either in the form of weather-dried stover or as ensilage. On the other hand, the outlay for fodder in the west during the summer months is almost confined to the expenses of keeping a herd-boy, and in some districts in this part of the country, and in the lower mainland of British Columbia, cattle graze at large during the winter season.

The number of live stock in Canada as enumerated at the census of 1891 included 1,471,000 horses; 4,121,000 cattle, of which 1,857,000 were milch cows; 2,564,000 sheep; and 1,734,000 swine. Ontario then possessed nearly half of the total stock of cattle, two-fifths of the sheep, and two-thirds of the pigs; Quebec followed with nearly a million horned stock, and about three-quarters of a million sheep; and Manitoba and the North-West Territories accounted for nearly half a million cattle and about a hundred thousand sheep. The estimates since published annually for Ontario show that there has been an increase in all classes of live stock, except horses, in that province; and the latest returns for Manitoba show some increase in the number of horses and pigs, and a decrease in cattle, while sheep have apparently remained stationary.*

The export trade in live and dead meat between the Dominion and the United Kingdom has grown up within the past twenty years, although the first shipment of Canadian live cattle to British ports was made in 1872 through the United States. For some years, however, prior

* The estimated number of live stock in Ontario on July 1st, 1896, included 2,182,000 cattle, of which 920,000 were milch cows; 1,849,000 sheep; and 1,270,000 pigs. In Manitoba the live stock estimates for 1896 comprised 95,000 horses; 211,000 cattle; 34,000 sheep; and 73,000 pigs.

to the opening up of this trade, large numbers of horned stock were exported over the border, and this traffic continued to be of some importance until it was practically extinguished by the high duties imposed under the McKinley tariff. The number of cattle exported annually during the past six years has been nearly a hundred thousand head, of which all but a few thousand were consigned to the United Kingdom. For some years prior to 1890 about 40,000 head of Canadian cattle were sold annually in the United States.

The United States has hitherto formed the chief outlet for Canadian sheep, of which the exports have averaged about 300,000 yearly in the past five years. Before 1895 the numbers sent annually across the Atlantic had not exceeded 60,000 head for many years, and in 1893 and 1894 it dropped to less than 20,000. In 1895, however, the consignments to the United Kingdom amounted to 138,000 head, while those to the United States dropped to 147,000 head. There is practically no external trade in live swine, but bacon and hams have been sent in increasing quantities in recent years to British markets, which practically have a monopoly of this trade with the Dominion. Hitherto, fresh and salted beef and mutton have been exported from Canada in comparatively small quantities.

On the whole, it would appear that the prices of the past few years have not been such as to induce farmers in the Dominion to turn their energies to increasing the production of beef for export, and in some districts the cost of feeding cattle in the winter, coupled with the fall in the price of meat, has reduced profits to a very low level. There can, however, be little doubt that, under suitable conditions, the production of meat of all kinds could be considerably increased, and in this connection it should be remembered that this branch of farming has as yet received little attention in the newly-settled territories.*

* Mr. Whitley, of the Canadian Department of Agriculture, writing in 1892, says of Manitoba, "all kinds of stock thrive remarkably well in this province, and almost every breed of cattle is represented. Beef cattle in certain districts are in special demand, and though the Manitoban farmer may only receive £6 10s. for a steer which

In the older provinces stock-keepers are finding it more profitable to increase their dairy herds, and there has been a remarkable extension of dairy-farming, especially in Ontario, in the past five years. The progress of dairying in the Dominion has, however, already been noticed on several occasions in the pages of this Journal, and it is not necessary to dwell at any length here upon this aspect of Canadian agriculture. The importance of this branch of farming to Canada may be best illustrated by the fact that the average annual value of her exports of cheese alone during 1892-96 amounted to nearly £3,000,000, this being about double the value of her exports of cattle, and representing over one-fourth of the aggregate value of her exports of all kinds of agricultural produce, excluding timber. Butter has not yet figured to any great extent in the Trade Returns of the country, but efforts are being made, by the establishment of creameries and the adoption of winter dairying, to develop the exports of this article.

The great centre of dairy-farming is Ontario, though in Quebec also the industry is a growing one. In the former province there are about 1,200 cheese factories and 140 creameries, nearly half the total number of these institutions having been opened since 1889. Efforts are being made by the Department of Agriculture to promote the establishment of dairy-farms in Manitoba and the North-West Territories, but wheat-farming still continues to be the principal pursuit in this region, and dairying has as yet made comparatively little progress. Another province in which the production of cheese and butter is becoming an important industry is Prince Edward Island, where there are thirty-two cheese factories and several creameries in operation. British Columbia is also said to offer excellent facilities for mixed- and dairy-farming, but the latter branch of agriculture has not yet received much attention. In Nova Scotia a number of cheese-factories and several manufactories of condensed milk have been established. An experimental dairy-station

sells in England for £18, he finds it profitable to raise them. Comparatively few sheep are at present to be found, but there seems to be a good opening for profitable investment in these golden-hoofed animals."

has been opened in New Brunswick with the object of developing the dairying industry in this province.

Another branch of farming of increasing importance in the eastern provinces of the Dominion is fruit-growing. According to the census of 1891 the orchards of Canada yielded in that year $7\frac{1}{2}$ million bushels of apples, 229,000 bushels of pears, 266,000 bushels of plums, 192,000 bushels of cherries, 44,000 bushels of peaches, and 321,000 bushels of other fruits. The production of apples for export is a prominent industry in the southern part of Ontario and in Nova Scotia. In Ontario the area of orchards and gardens devoted to apple culture has steadily increased since 1891 and now amounts to 203,000 acres. Nova Scotia has for many years exported apples to the United Kingdom, the orchards in the Annapolis Valley, in that province, being celebrated for the growth of apples of fine flavour and brilliant colour. Here also plums are largely grown and the cultivation of cranberries is becoming a large and profitable industry. The principal orchard district in Quebec is the island of Montreal where the soil is favourable to the production of the finest varieties of apples. Farmers in New Brunswick are also turning their attention to the development of their orchards. In the remaining provinces of Canada, fruit-growing is not yet extensively practised. Very little fruit is grown in Manitoba and the North-West Provinces. The culture of various kinds of fruit will, it is believed, form one of the leading industries of British Columbia in the near future, and the plum and prune industry is held to be capable of almost indefinite extension here, as the soil and climate are especially favourable.

Apples are exported from the Dominion both in the raw form and dried or evaporated in the shape of chips and rings. The total value of the exports of this fruit in 1895 was £432,000, and of this sum £354,000 was debited to the United Kingdom.

To take a broad view of the characteristics of Canadian agriculture discussed above, it may be said generally that in the older provinces wheat-growing is gradually giving place to a more diversified system of farming. Agriculturists in

this part of the country have found it increasingly difficult to compete with the western settlements in the cultivation of wheat, and, as a result, their energies have been directed to more remunerative branches of farming, and particularly to dairying and fruit culture. In Manitoba and the North-West Provinces wheat is "king," and it is on the immense areas of fertile virgin soil of this region that the bulk of the wheat produced for export will continue to be grown.

The prominent position occupied by agriculture among the industries of the Dominion may be illustrated by reference to the relation the value of the exports of the products of the farms and orchards bears to the total value of the exports of all kinds of Canadian produce, excluding coin and bullion. For the past three years these values compare as follows :—

Year.	Value of all Exports.	Value of Exports of Agricultural Produce (excluding timber).	Percentage of Agricultural to all Exports.
	£	£	
1894	21,636,000	9,959,000	46
1895	21,423,000	10,111,000	47
1896	22,856,000	10,152,000	44

Over four-fifths of the aggregate value of the agricultural produce exported, excluding timber, is accounted for by the consignments to the United Kingdom. The principal articles included in these exports are live-stock, grain, meat, cheese, peas, and apples. The value of Canada's exports of farm products to the United States, her next largest customer, has ranged from £950,000 to £1,460,000 annually during the past three years, the principal items being wool, hides, barley, hay, horses, and sheep.

Timber is not included in the foregoing statement of the value of the exports of agricultural produce, but the products of the forest constitute a considerable item in the external trade of Canada. During the past three years her average exports of logs, lumber, and square timber have amounted to a sum exceeding £5,000,000* annually, of which about

* This does not include the export of bark, firewood, wood-pulp, wood for wood-pulp, which amounts to about £250,000 in value annually. The exportation of wood-pulp is increasing.

one-half is accounted for by the shipments of timber to the United Kingdom. The total value of the forest-products of the Dominion is estimated by the Statistician of the Department of Agriculture to have amounted in 1890 to nearly £16,000,000. The great timber region lies in the older provinces extending from the head of Lake Superior to the Atlantic littoral, but British Columbia is also well timbered. According to the authority just referred to, the ownership of Canadian forests in Ontario, Quebec, New Brunswick, and British Columbia is for the most part vested in the provincial governments, which grant licenses to the lumbermen. In Nova Scotia and Prince Edward Island there is no system of timber licenses, the trees are sold with the land, and not much timbered Crown land remains.

It is estimated that the Canadian forests contain over one hundred varieties of timber trees. Among these the Weymouth pine ranks first in value, and is the main object of the lumber-trade of Ontario and Quebec. Spruces are next in commercial importance, being largely exported from the Atlantic provinces, and in British Columbia there is a variety of coniferous trees.

The work undertaken by the Dominion Department of Agriculture in furtherance of Canada's leading industry has been frequently referred to in earlier numbers of this Journal.* One of the earliest steps in this direction was the establishment of a central experimental farm at Ottawa, with a number of branch farms in various parts of the country. The next important development was the establishment in 1890 of experimental dairy-stations and the provision of an organised scheme of instruction in butter- and cheese-making by means of itinerant lecturers under the direction of a Dairy Commissioner. The dairy-stations were established with two purposes in view, viz., the investigation of those processes of manufacturing cheese during the summer, which yield the finest quality as well as the greatest quantity of cheese from the milk; and to encourage farmers

* Vol. I. No. 3, Vol. II. No. 1, Vol. III. Nos. 2 and 3.

to take up winter-dairying for the manufacture of butter and the raising of calves and pigs during that season. At the Central Experimental Farm experiments have been carried out in the feeding of steers for beef; the economical feeding of milch cows; the fattening of pigs; the growth of fodder crops; and the use of ensilage. The results of all these experiments and investigations are widely circulated amongst farmers throughout the Dominion.

The Department of Agriculture has recently given attention to the improvement of the systems of storage and transport of agricultural produce intended for export, and arrangements have been made for the establishment of an effective cold-storage-service at the principal exporting centres, and for the provision of refrigerating chambers on seventeen steamships.

CONDITION OF AGRICULTURE IN INDIA.

Some interesting information, prepared from the records at the India Office, has recently been published relating to the condition of agriculture in India before the recent famine.* From this it appears that although in some tracts of the country partial depression of agriculture has been felt, still, in India as a whole, apart from the recent famine, the condition of agriculture during the past ten years has been flourishing. The breadth of land under cultivation has extended; the number of stock is larger; the rental and revenue from land have grown; the exports of agricultural produce have advanced; and the prices of agricultural products have not fallen. In support of these general statements, statistics are submitted showing the changes in the cultivated area and the number of live stock in certain typical provinces. The estimated arable area in four large progressive provinces in the north, south, and centre of India, viz., the Panjab, Central Provinces, Madras, and Lower Burma, which may be regarded as representative of the whole country, shows a rise in the acreage under the plough, including current fallows, from an average of 72,200,000 acres in 1886-88 to 81,000,000 acres in 1893-95. For the same periods the estimated numbers of cattle of all kinds in three fairly representative provinces—Panjab, North-west Provinces and Oudh, and Bombay—show an increase of about 6,000,000 head, the average for 1886-88 being 41,222,000, and that for 1893-95, 47,149,000 head.

With reference to the signs of improvement contained in the returns of rental and revenue from land, it is pointed out that in some provinces, occupied by petty peasant proprietors,

* Appendix to Final Report of the Royal Commission on Agriculture. [C 8541.] Price 1s. 3d.

only a small part of the land is let to tenants, and there no actual rental can be quoted. The land revenue is everywhere a fair measure of the probable true rental, for it is usually assessed at rather less than half of the estimated "fair rental" of the land, and it is ordinarily much less than hal the rack-rents at which small farms are sublet by peasant proprietors. For some provinces, therefore, the actual rentals are returned, for others the land revenue only, and these details for certain provinces are compared below :—

—	Average of 1886-88.	Average of 1893-95.
	Rx. (tens of rupees).	Rx.
Panjab, land revenue	2,114,000	2,382,000
N.W. Provinces and Oudh, rental	8,255,000	12,207,000
Madras, land revenue	4,503,000	4,887,000
Central Provinces, approximate rental	1,042,000	1,201,000
Burma, revenue	*1,379,000	2,353,000
Total land revenue of British India.	*22,946,000	25,301,000

Further evidence of progress is furnished by the increase in the value of the exports of agricultural produce. The average annual value of these exports has risen by about 35 per cent. comparing 1881-85 with 1891-95 ; the details are given as follows :—

Articles Exported.	Average value of exports of 1881-85.	Average value of exports of 1891-95.
	Rx. (tens of rupees).	Rx.
Cotton and Indian cotton goods	16,717,000	19,646,000
Rice	8,276,000	12,574,000
Wheat	6,628,000	7,124,000
Oilseeds	8,086,000	12,828,000
Indigo	4,141,000	3,871,000
Jute, raw and manufactured	6,532,000	11,476,000
Tea	3,698,000	6,324,000
	54,078,000	73,843,000

* In the earlier years Upper Burma had not been pacified, and did not yield full revenue. If the country had been quiet perhaps Upper Burma would in the earlier years have been yielding Rx. 300,000 more.

The foregoing statements and figures are held to warrant the conclusion that apart from drought and famine Indian agriculture is not in a depressed condition. Neither of the periods taken for comparison above was marked by famine over considerable areas. Farms are not vacant; rents have not fallen; land has not been thrown out of cultivation; and prices of produce remain fairly stable, subject to local changes of price caused by adverse or favourable seasons in particular provinces. As an example of such changes it is mentioned that in the Panjab, after several good harvests, the wheat crop of 1894 was the heaviest within living memory, and the local Government reported that the average price of wheat all over the Panjab for April, 1894, was little more than half the price for April, 1893. But these very low prices did not last long, and no general depression of agriculture ensued.

The great extension of railways, whereby produce can be moved from province to province and to the seaboard, is said to partly account for the general prosperity of Indian agriculture during the past ten or fifteen years. It must be remembered that India is a large country with a huge population, which consumes at home the greater part of her produce; land and labour are both cheap in India, compared with other countries; and the agricultural produce of other lands has never been able to compete with India's own products in her home markets. The maintenance of a silver currency in India may, it is believed, also have been an important factor in steadying prices, and so contributing to agricultural prosperity in India. If there had been a gold standard of money in India, prices of produce might have fallen somewhat in sympathy with gold prices in Europe. The fall in price would then, it appears, have been most marked as regards cotton, rice, wheat, and oil seeds, which are exported or exportable; the fall would perhaps have been less marked in the case of millets, which are not exported, and of jute, which India alone produces in any quantity for the wants of the whole world.

With respect to the changes in the prices of agricultural staples in India during the past twenty-five or thirty years, the following details are extracted from an interesting table,

showing the variations in the average annual prices of the principal food grains at selected Indian marts, taking the annual average price of 1873 as 100:—

YEARS.	WHEAT.			RICE.		MILLET.	
	At Bombay.	At Cawnpore.	At Karachi.	At Calcutta.	At Rangoon.	At Bellary.	At Ahmedabad.
1861-65 -	119	79	113	73	94	142	173
1866-70 -	138	110	124	83	104	157	168
1873 -	100	100	100	100	100	100	100
1871-75 -	102	84	113	82	98	87	110
1876-80 -	143	99	152	104	107	178	153
1881-85 -	107	82	114	90	98	74	107
1886-90 -	116	99	132	81	106	84	130
1891-95 -	114	106	127	109	106	107	118

Wheat prices are stated to have been greatly affected by the recent famine, but if coming harvests are good, normal prices may be expected to prevail in 1899-1900.

In connection with the question of prices, the probable course of wheat cultivation in India is briefly referred to. It is pointed out that there has been some extension of the area under wheat in recent years,* and that this was partly in response to the export demand. The largest wheat exports ever sent from India were 1,515,000 tons in 1891-92; the wheat exports were 345,000 tons in 1894-95, and 500,000 tons in 1895-96. Another cause of the increase of the wheat area of the Panjab was the

* Subjoined are figures for the wheat acreage of the three chief wheat-growing provinces:—

——	Area of Wheat Cultivation in Acres.				
	1888-89.	1890-91.	1892-93.	1893-94.	1894-95.
Panjab - - -	6,919,000	6,223,000	7,020,000	8,265,000	8,052,000
Central Provinces -	3,866,000	4,086,000	4,197,000	3,986,000	3,309,000
N. W. Provinces and Oudh	4,777,000	4,490,000	4,641,000	4,827,000	4,614,000

extension of canals in that province, where wheat is largely an irrigated crop. As canal irrigation advances further the wheat area of the Panjab will probably increase still more. Elsewhere it is not considered likely that it will expand rapidly to the exclusion of other food crops, unless high prices in Europe or failure of European supplies from other sources create a new export demand in India. It is observed that when, or if, prices of wheat in London rule generally at 28s. a quarter or upwards, India is likely to send wheat to England, provided freights keep low; but that with India's increasing population, and the advanced home demand there, her exports of wheat are not likely to reach the high level of 1891-92, unless circumstances change greatly.

The shrinkage of India's wheat exports is said to be probably due in part to the fall in European prices since 1891-92; partly to short harvests in some of the wheat-growing provinces such as Chutteesgarh; and partly to the demands from other provinces. A notable case of such a demand arising within India occurred in 1894-95, when the North-West Provinces and Oudh drew large supplies of wheat from the Panjab to meet deficiencies caused by short harvests. It is doubtful whether the partial rise in the gold value of the rupee, due to the closing of the Indian mints in 1893, has had any appreciable effect on India's export trade in wheat. If freights had not ruled very low, and if the exchange value of the rupee had not been far below the old (so called) par value of ten rupees to the pound, Indian wheat could hardly have come to Europe at the prices of 1893-96.

CO-OPERATION AMONGST FRENCH FARMERS.

In the *Journal* for September, 1894 (Vol. 1, No. 1), an account was given of the working of the co-operative agricultural associations, or syndicates, as they are usually styled, in France. The action of most of these syndicates is limited to a comparatively small area, often only a single commune. Many of them, besides having in view the general interests of farming in the district, have also devoted their attention to special points, while others have been formed in the sole interests of some particular branch of agriculture. The French *Office du Travail* has recently published, under the title of *La Co-opération de Production dans l'Agriculture*, the results of an investigation into this subject made by the Comte de Rocquigny, and the following notes on some of the less usual forms of co-operation are summarised from that work.

Co-operation among Stock-Owners.

Among the forms of co-operation of which an account is given is the association of cattle-breeders for the purpose of improving their herds. This appears to be a recent development, and to have originated in Switzerland about 1888, but its extension in that country has been such that there are now some three hundred societies working. In practice the system usually adopted is as follows :—Some fifteen or twenty peasants in a parish combine together to purchase a pure-bred bull, which becomes their collective property. A herd-book is opened, and each member of the society is expected to register for service the name of at least one breeding cow of pure blood, recognised as such by a committee of experts. The finest of the calves thus procured are inscribed in the herd-book as breeding animals ; the others are sold. The expert committee

periodically inspects the breeding animals to see that they are well kept, and that the young animals are properly reared. By such means the value of the herd is materially increased, and the fact that an animal is entered on the register of the society at once enhances its selling value.

While co-operative societies of a more or less similar type exist in France, a system more in favour among the French associations appears to be the purchase of stallions and bulls of good quality, which are put up to auction among the members. The use of these animals for service is also generally either limited to the members of the society, or else only available to outsiders upon payment of a higher fee.

Numerous syndicates have been formed in France to secure for their members the advantage of cheap fodder, etc., by obtaining large quantities at wholesale prices. These associations were especially useful during 1893, when forage was scarce in France; in fact the drought in that year appears to have given a considerable impetus to the formation of this class of co-operative bodies. In that year the purchases of fodder, straw, bran, grain, maize, cake, agricultural salt, peat for litter, etc., by several of these associations amounted to many thousands of pounds.

A curious instance of associations for the common ownership of a herd is recorded from Castellar, near the Italian frontier. The care of the collective herd (which consists of draft oxen, she-asses, and some milch-cows) devolves upon each of the members in turn for one week, he during that time enjoying the services and produce of the herd. The animals are pastured on the lands belonging to the commune, or on private enclosures when the owner permits. When a member dies or retires from the association, the herd is divided-up and the society re-formed. If an animal is sold or dies the price or loss is divided among the members in proportion to the interest of each in the herd. These associations, of which there are some thirty in Castellar, are very ancient, and it is said that the system has never given rise to any difficulty among the inhabitants.

Mutual insurance of cattle has considerably developed of late years in France, and in the department of La Vendée alone

fifty-five associations have been established for the purpose. The business of these societies is usually confined to insurance against mortality, but there is one instance of a society insuring its members against the seizure of carcases, intended for the butcher, which are declared by the authorities to be tuberculous. The insurance of the milch cows of their members has also become a common feature in co-operative dairies.

Milling and Bread-making.

In several districts in France agriculturists have succeeded in dispensing with the services of the miller by the formation of milling associations on a co-operative basis. One such example is the Co-operative Milling Society of Arbois (Jura). The capital of this Society is not fixed, but may be varied between £800, consisting of founders' shares, and £4,000, the difference being made up of more shares, or of bonds subscribed for by associates. A mill was purchased by the Society at a cost of £560, and opened on the 1st December, 1894. The shareholders and associates undertake to have ground by the Society all the grain required for domestic purposes and for their animals, but they are not allowed to trade in flour. The charge made by the Society for threshing, winnowing, and milling the grain is about $6\frac{3}{4}$d. per cwt. of grain. The net profits at the end of the year are divided as follows:—20 per cent. is placed to the reserve fund, 5 per cent. goes to the shareholders, 25 per cent. to the employés, and 50 per cent. to such shareholders or associates as have spent ten francs (8s.) at least in milling or other work. On the 1st November, 1895, the number of members was 220, and some 30 cwt. of grain was being ground per day. Under the existing arrangements, each member receives back the flour made from his own grain, but it is hoped that in the future it may be possible to put all the corn into a common stock.

Another Society in the north of France has purchased a flour-mill with modern machinery at a cost of £6,000. In this case the corn is purchased from the members at the current market price, and the resulting flour is also sold at current prices, preferably to co-operative societies. Twenty-five per cent.

of the profits is divided amongst the shareholders proportionally to the amount of corn delivered during the year, and a further 25 per cent. is divided among the co-operative and other bakeries which have affiliated themselves to the mill in order to ensure a sufficient outlet for the flour. It is estimated that the 25 per cent. returned to the farmers is equivalent to an increase in the price of wheat of from 1s. 2d. to 1s. 8d. per quarter, and in addition the charges of the corn-dealer, who usually receives 5d. to 10d. per quarter, are eliminated.

Co-operative bakeries are numerous in France. Generally speaking, they are consumers' associations, buying the flour required; but there are some country districts, notably in the Charente-Inférieure, where these associations receive the farmers' wheat, and deliver to them bread in return. One such syndicate, for instance, takes from each member as much wheat (of good merchantable quality) as is necessary for the food of his family, and gives an equivalent of bread in return; whatever the price of grain, the member receives 65 lbs. of bread for every 78 lbs. of wheat. So far as concerns the consumption of his own family, therefore, the farmer is independent of fluctuations in the price of corn. This society further buys from the outside trade a certain quantity of flour of the best quality to mix with that received from the farmers, so as to improve the bread. A second syndicate, the members of which pay no subscription, takes the wheat from the farmer, grades it, and passes it on to the miller. The wheat is valued once a month, according to current quotations, and the farmer receives a ticket for bread to the value placed on his wheat. The price of bread is also determined once a month by a committee, this price being based on the net result of the month's trading. This society counts some 600 or 700 members, and makes about 236 cwts. of bread per month—the price (at the beginning of 1895) being roughly $3\frac{1}{2}$d. per 4 lb., as against the trade price in the neighbourhood of about $4\frac{1}{4}$d. per 4 lb.

Protection of Growing Crops.

In many districts of France the farmers have found it necessary to have recourse to combined action to protect

their growing crops from destruction by insect and fungoid attacks.

Among insects which call for energetic measures on the Continent is the cockchafer, especially its larva, and numerous associations have been formed to combat its ravages, particularly at the periods of its triennial swarms. Usually the members of a syndicate contribute to its funds in proportion to the area they cultivate, while children are paid by the association to collect the grubs and mature insects, a half-penny per pound being a not uncommon price. But other insects also form the object of co-operation. An association exists at Pontivy for the destruction, by means of sulphate of copper solutions, of the apple blossom weevil (*Anthonomus*). Still more numerous are the syndicates formed for the protection of the vine from the attacks of the phylloxera and various fungoid diseases, as well as against frosts (this last is done by burning some material yielding a heavy thick smoke, and so covering the vineyards with an artificial cloud). Other syndicates exist for protecting the crops against the depredations of game, for maintaining country roads in good order, and other purposes.

Mutual insurance, by co-operation among the inhabitants of a locality, against the destruction of crops by hail is not considered practicable, on account of the heavy risks and the too limited area covered by such associations. But syndicates can usefully negotiate with hail insurance companies to secure advantageous terms for their members, and this has been successfully done in many districts.

Preparation of Preserves.

The business of preserving fruits and vegetables is also one which has been successfully organised on a co-operative basis, particularly in districts where these products find no remunerative outlet in a fresh condition, more especially in seasons of great abundance. When the markets are encumbered with fresh fruits and vegetables, French producers have found it advantageous to form associations for the preparation of preserves of fruits, peas, beans, tomatoes, and other products, either by evaporation, as in America, or by other processes. The manufacture of fruit pulp from apricots has

been adopted in Provence, several localities having their associations of producers, who have combined to erect the machinery for transforming the fruit into pulp, without the intervention of a middleman, during seasons of excessive abundance, when the price of fresh apricots is so low as to barely pay the cost of picking. Co-operative associations for the preparation of capers in the same district are noticed separately on p. 221. Another instance of a similar character is recorded from the department of the Alpes Maritimes, where co-operation has been applied to the distillation of perfumes from flowers.

Manufacture of Wool.

The "Syndicat Agricole de la Montagne Noire," in the south of France, which has about a hundred adherents, has undertaken, in view of the fall in the price of greasy wool (amounting to over 50 per cent. during the past ten or twelve years), to get the fleece produced by its members worked up into cloth, and to sell the manufactured article directly for the profit of the society without the intervention of a middleman.

Each member receives a ticket, on which is entered the quantity of greasy wool delivered by him to the manufacturer; the wool is washed, and the weight of the washed wool is also entered upon the ticket, as well as the quality, since the ultimate price paid to the producer depends upon the grade of the wool delivered. In June, or soon after, the manufacturer submits a certain number of patterns to the committee of the syndicate, who decide on the types to be reproduced, and the wool is then worked up into the various kinds of cloth selected for reproduction. The manufacturer receives 100 francs (£4) for preparing these patterns, and he is paid 1s. 10d. to 2s. 3d. per yard of cloth made, according to quality. The sale begins in October, and is entrusted to agents who are responsible for the clients they accept; they receive 6 per cent. on the sales. The goods are usually cleared off by February, the balance is struck in March, and the profits are divided among the members. In 1893-94 the average price received by the flock-owners was $5\frac{1}{4}$d. per lb.

of greasy wool; in 1894-5 it was 4¼d. per lb. As, however, they had previously been able to obtain only about 3d. per lb. from purchasers of their fleeces, the above sums represent a considerable gain. The quantity of cloth made in 1894-5 was about 1,200 yards. The syndicate is endeavouring to form a reserve fund which would allow of prompt payment, upon delivery of the wool, to such flock-owners as stand in need of it.

Mutual Assistance among Peasant Farmers and Labourers.

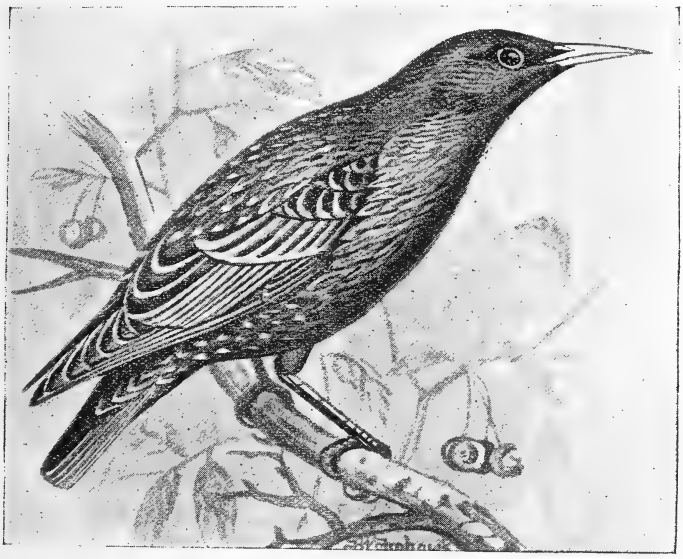
Several associations exist in various parts of France with the object of rendering practical assistance to any member of the society who may be incapacitated by illness or infirmity from performing his ordinary work. Such help is given in kind, and consists usually in the active members in turn giving a day's work on the land of their disabled fellow-labourer. This system is most common among the owners of small vineyards, but it is also to be met with among general agriculturists. In at least one instance the day-labourers also form part of the association, other members taking the place of the invalided worker, who thus still draws his wages during illness. Another association has also included in its business the provision of pensions for the aged and for orphans; the pensions of these last are paid to persons who are willing to receive and board the orphans, and thus retain them in their villages.

THE STARLING (*Sturnus vulgaris*).

The starling is of considerable service to agriculturists, as its food consists principally of worms, snails, larvæ of various kinds and many insects in their different stages. It is especially useful in clearing off cockchafer larvæ and other larvæ of the same habits in meadow-land, and surface caterpillars in turnip and mangel fields. The destructive larvæ of the Antler moth, the Diamond Back moth, the Plusia Gamma moth, and of other moths, as well as those of the Daddy Longlegs, and of the Click Beetle (known as wireworms), are also devoured eagerly by this bird. In the late autumn and winter, when the starlings congregate in flocks, they clear whole fields of injurious insects in larval or pupal form, and their sharp eyes detect the eggs of at least the larger insects upon forest and orchard trees. The insects that hibernate in the larval or pupal form upon fruit and other trees are, without doubt, picked out of their winter quarters by the long, pointed beaks of these sharp-eyed restless birds. Sheep regard starlings as their natural friends, and permit them to alight on their backs to take out the ticks from their wool. Starlings accompany rooks in meadows and fields in a joint search for insects, but they are not found with rooks when these birds attack ripening cornfields or commit similar depredations. In the summer a pair of starlings may often be seen in meadows and fields near their nesting place, surrounded by five or six young ones, busily engaged in hunting for insects. Broods frequently keep together until the autumn, when they join the flocks congregated for the winter.

Starlings, as Seebohm points out, are sometimes seen high up in the air, like swallows and swifts, coursing about in search of insects. In the breeding season the quantity of insects consumed by these birds is enormous, so that in some countries they are encouraged to nest in fruit orchards, and although they sometimes take fruit, it is hardly

credible that practical persons like the German fruit-growers would fix up boxes for the purpose of attracting starlings to build therein if the birds did not far more than compensate for the little fruit they might eat by their wholesale destruction of insects of all kinds. Cherry-growers in Kent complain that cherries are taken by starlings; but so many other birds, acknowledged fruit lovers, are attracted by the luscious fruit, that starlings may be unjustly accused, or condemned, as being found in the company of notorious offenders. It is also alleged that



they take other kinds of fruit, and injure pears and apples by pecking them. In the winter, when their natural food is difficult to find, they eat "hips and haws," and Seebohm says that they take elderberries in the autumn. On the whole, however, the balance of benefit they do is very greatly in their favour, and they should be looked upon as among the best friends of agriculturists.

The starling is so well and widely known throughout Great Britain and Ireland as hardly to need description. It is nearly $8\frac{1}{2}$ inches in length. The beak of the adult male is yellow; the head, neck, and back, and all of the under part

of the body glossy black, with metallic purple or green tints; the feathers on the shoulders are tipped with buff or dead gold colour; and the wings are greyish black with a fringe of reddish brown. In the adult female the colour is similar, but not so glossy and lustrous as in the male, and the body is more spotted. In the autumn the adults are somewhat lighter in colour, and lose the metallic lustre in a degree.

Pairing takes place early in the year, depending on the weather, and eggs are generally found in the first weeks of April. The starling builds, without much care or art, in holes of trees, eaves of buildings, church towers, caves, clefts, and holes in rocks. In some cases, twigs, straw, hay, grass, or moss are used to line the nest, but sometimes scarcely any lining is supplied. The average number of eggs is six, of a beautiful blue colour, and very slightly more than an inch long. There are often two broods in a season from one pair, and eggs are found from the beginning of April until the end of June.

When the nights begin to be cold in the autumn the starlings congregate in large flocks, and frequent moist marshy districts by preference, roosting in reed beds and osier beds. They spread over fields and meadows in search of insects by day, and return to their roosting places at night. Yarrell says "these birds roost by thousands among beds of reeds in the fenny parts of Essex, Cambridge, Huntingdon, Lincoln, and other counties, where, alighting in myriads upon this flexible plant, they crush it to the water's edge." They also roost in large woods, shrubberies, and plantations. According to Seebohm a large flock of starlings will divide into several parts as the night approaches, each going to a separate roosting place. He adds, "Starlings often congregate with rooks and jackdaws, in the autumn on the pastures, and later in the year with redwings. When alarmed, the starlings, as if to a bird obeying a commander's voice, fly off in a compact mass, and if the danger soon passes, they will wheel and return again in the greatest order. The rooks and daws will scurry off in all directions, and the redwings will seek the nearest trees in a long straggling train, but the starlings seem to act under one common impulse."

In hard weather, and when food fails, the starlings migrate to Cornwall and Wales, the Western counties, and other parts of the country where frost is not so intense, but they ultimately return to their native places, and the same pairs occupy their accustomed nests.

It is considered by experts that starlings have decidedly increased during the last twenty-five years. This is due probably to the fact that they are held to be useful birds, and to their habit of congregating in large companies during the winter, travelling far and wide from their roosting places in search of food, and moving on from place to place if food should fail. They are strong and bold birds, and in the summer, when they are single or in pairs, they are not driven away from their nesting places by other birds, not even by the pugnacious, ubiquitous sparrow, which is fast exterminating swallows.

The starling is not in the schedule of the Wild Birds Protection Act of 1880, but it cannot be killed during the close season (which is, as a rule, from the 1st of March to the 31st of July), except by an owner or occupier of land, or by his agent. By the provisions of the Wild Birds Protection Act of 1894, the eggs of the starling are protected in Chester, Cambridge, Devon, Essex, Isle of Wight, Kent, Middlesex, Norfolk, Northumberland, East Suffolk, and the East Riding of Yorkshire. The starling is protected in the county of Middlesex throughout the whole of the year.

AGRICULTURAL DEVELOPMENT OF THE LAST TWENTY YEARS.

Publication has recently been given in the Appendix to the Final Report of the Royal Commission on Agriculture to a series of interesting tables prepared by Sir Robert Giffen, and intended to throw light on the rate of progress in the production of cereals, potatoes, and meat in comparison with the growth of population in the countries of Europe, including countries, like the United States, where the population is of European race. In a prefatory memorandum Sir R. Giffen states that it was not intended, and that it would, in fact, be impossible, to make the comparison very correct. The populations in question are not of the same piece all through: a unit of population in Russia does not mean the same thing as regards power of consumption as a unit of population in the United States or the United Kingdom. Again, as regards cereals, the area cultivated is taken as the measure of increased production rather than the aggregate yield, as the more convenient course when one year is compared with another at a distant period—the more elaborate method of striking an average of the production of several years being hardly available, in consequence of the difficulty of getting the data over so wide a surface and the uncertainty existing as to the reliability of the methods followed in estimating the production in some countries. The assumption is therefore made that in the two periods compared the yielding power of the average acre is about the same. As regards cattle, sheep, and swine, it is observed that the remarks already made as to the unit of population in different countries apply; there are "cattle" and "cattle," "sheep" and "sheep," and so on.

Space will not permit of the reproduction of the detailed tables, but the general results are brought out in the

following summary, which shows the rate of growth of population, of area under leading cereal crops and potatoes, and of cattle, sheep, and swine in the last twenty years (approximately) compared*:—

	Twenty Years ago.	Present Time.	Increase.	
			Amount.	Per cent.
Population - - - millions	366	462	96	26
Area under wheat- - million acres	133	158	25	19
,, barley - ,,	43	45	2	5
,, oats - - ,,	81	104	23	28
,, rye - - ,,	105	100	5 dec.	5 dec.
,, potatoes - ,,	21	27	6	29
Cattle - - - - - millions	154	211	57	37
Sheep - - - - - ,,	405	478	73	18
Swine - - - - - ,,	80	101	21	26

It should be noted that the expression "present time" in the summary refers to the year 1893, but for several countries the necessary statistical data for that year could not be obtained, and in such cases the nearest year prior to 1893 for which information was available was taken. Similarly, the term "twenty years ago" applies to the year 1873, but in cases where the information was not forthcoming for that year the figures for the nearest year to 1873 were adopted. Allowance should therefore be made for these differences, and the results shown in the summary should not be regarded as more than an approximate indication of the changes that have occurred.

The effect of this comparison is, that while population has increased 26 per cent., only one cereal crop—oats—has increased in proportion, viz., 28 per cent. The increase in wheat is 19 per cent. only, and in barley 5 per cent. only; while rye, which has hitherto been an important crop in Europe, has diminished 5 per cent. It is Sir Robert Giffen's view that the figures clearly suggest, speaking broadly, that

* In this summary table the population and live stock of India are excluded, but the acreage under cereals is included, as the growth has been largely for European consumption, and the population of India generally does not consume the cereals here enumerated, but other cereals. The acreage of potatoes is exclusive of the acreage in Asia and South America, as no information was available for those regions as to this crop.

the decline in wheat in the last twenty years is not due to any great growth of production in excess of the growth of the consuming population. The facts are rather the other way. The growth of the acreage under wheat has lagged behind the growth of population; oats alone have grown *pari passu*, and of the other cereal crops rye has absolutely declined.

This impression of the figures is, it appears, not diminished by an analysis of the growth of population. The two large items of increase of population are those of Russia and the United States, about equal in both, and while the unit of population in Russia may be considered of low consuming power, that of the United States may be considered of high consuming power, so that the one is a set-off against the other, and the effect is to confirm the general average above stated. Among the miscellaneous populations of Europe, the largest wheat-consuming multitude, the growth of population, exclusive of Russia, is about 15 per cent.

The impression of the figures is also not diminished, apparently, by the consideration of the countries where the enlargement of the cereal area has taken place. Out of a total increase of 25 million acres of wheat, no fewer than 13 million acres are in North America, where the average production per acre is low; $2\frac{1}{2}$ million acres are in South America, where the average production is also low; and another $2\frac{1}{2}$ million acres are in Australia, also with a low average production per acre. On the other hand, the growth in Europe is 6 million acres only, and that chiefly in Russia and other parts where the production is also low—the acreage in the United Kingdom, where the production per acre is high, having declined. The increase of acreage, small as is the proportion it bears to the increase of population, is considered to be probably higher than the increase of production has been. The same remarks apply to barley and oats. The small growth of the former crop, such as it is, is in the new countries, where as yet the production per acre is low. In the case of oats, of a total increase of 23 million acres only 4 million acres are in European countries; the remainder of the increase is chiefly in North America, where it amounts to 18 million acres.

In rye, as already stated, there is an absolute decrease, and the decrease is exclusively in the European countries.

As regards potatoes, the effect of the tables is to show that production has disproportionately increased, the increase being exceptionally marked in Russia, while it is also noticeable in France, Germany, and Austria. It is interesting to note that while certain countries, especially Russia, are comparatively stationary as regards wheat culture, the production and consumption of the potato appear to be increasing.

It appears that if minuter or more exact comparisons were attempted as regards cereals, it would no doubt be found that while the growth of acreage is much less than the growth of the consuming population the growth of production would be less still.

"It may well be asked then," says Sir Robert Giffen, "what is the cause of the decline in the price of wheat, since it can hardly be excessive production? Apart from the question of the change of the level of all prices arising through a relative change in the measure of value, as compared with a previous period—a question which need not be discussed here—it may be suggested that, as the fall in cereals cannot be ascribed to an excessive growth of the production of the cereals themselves, it must be ascribed, seeing that there has been a great increase of the resources of the consuming peoples themselves, to a diminution of demand arising from various causes. What can be these causes? Why do people as they grow richer consume less wheat, etc., instead of more?"

The answer to the last question is to be found, he thinks, in an examination of the figures as to live stock, which he proceeds to make. People consume less cereals per head because, with their increase of resources, they consume more meat, which *pro tanto* displaces the cereals.

In this connection the suggestion of the figures is especially remarkable as regards cattle, where the increase is 37 per cent., as compared with an increase of 26 per cent. only in population. And here the impression conveyed by the figures is enhanced by an examination in detail of the

growth of the numbers of cattle; for it appears that, while a very large part is in North America and in other new countries, there is still a very considerable increase in Europe—no fewer than ten millions out of a total increase of fifty-seven millions. It has also to be considered that, so far as cattle are concerned, the new countries are not behind the old, while the increase in meat for consumption is probably greater than the mere increase of numbers shows, through a continuous improvement that has been going on in the breed of cattle whereby their average weight has been increased, and as the fattening process has been accelerated the same numbers of stock supply a larger number annually for the butcher than they did.

Attention is also called to the fact that during the last twenty years the accessibility to markets of a large part of the herds of the world has been increased. Twenty years ago, in many parts of the world, cattle had hardly any value except for hides, horns, and offal; but all this has been changed, and is being changed.

The figures as to meat, therefore, striking as they are, underrate the effect of the change as regards meat production and consumption, which has been going on in the last twenty years.

The figures as to sheep are not so striking as those as to cattle. They resemble at first sight the figures as to cereals. The detailed tables show that in European countries generally there is a decline in sheep, and the increase is exclusively in new countries like Australia and the Argentine Republic. The last remarks as to cattle, however, apply also to sheep. The breed and average weight have increased in each district; the fattening process has been accelerated; and, by means of refrigerating and other processes, the sheep of countries that formerly did not count in the supply of mutton to Europe, such as New Zealand and Australia, have come to count a great deal. The meat that existed, but was wasted for want of a market, is now utilised.

The same remarks apply to swine that apply to beef, subject to the qualification that the percentage increase is not so great. While the growth of the numbers of swine is

largely in the new countries, it is not exclusively so—there is a very large increase in European countries.

Altogether, therefore, it is evident, in Sir R. Giffen's opinion, that the distinguishing characteristic of agricultural production and consumption in the last twenty years has been the growth of the production and consumption of beef, mutton, and pork, and that in this lies the explanation of the slower relative growth of cereals, and the great decline in the price of cereals. The latter have been subjected to a new indirect competition of a most formidable kind. They have not been benefited by the large growth of a richer and richer population as they might have been expected beforehand to have done. The increased wealth has gone to the purchase of meat, and a meat-eating population consumes less cereals than a population eating less meat would do, although the meat-eating population generally has the larger power of consumption.

He believes that the figures upon which he bases this view would be strengthened if account were taken of the growth of the production and consumption of sugar, and perhaps other articles, such as rice. He considers, however, that the facts as to meat, besides being the most striking, are the most interesting for the future of agriculture. It may be assumed that the growth of the production of dairy produce corresponds to some extent to the growth of the numbers of cattle, but this point is not dealt with.

In discussing the practical question as to whether there is room for a rapid growth of meat production in the next twenty years, such as took place in the last twenty, Sir R. Giffen remarks as follows :—

1. As regards wheat and other cereals, it may be doubted whether the displacement of wheat by meat can go any farther. There is probably a minimum in the consumption of wheat below which a meat-eating population will not go, so that now the growth of population will, perhaps, tell more than it has done.
2. As regards mutton, at least, the increase of marketability, which is one of the material factors of the last twenty years, has probably gone as far as it can go. The difference between New Zealand and English mutton, as far as the English market is concerned, cannot be much farther diminished.
3. The same, perhaps, cannot be said of beef that can be said of mutton, as the refrigerating processes in this case are only being perfected, so as to bring the beef of Australia as freely into competition as that of America now is. But in

relation to the whole meat supply, I think this is a smaller element than it was and a rapid increase of the supply of meat from the United States is not to be expected.

4. New countries are much more fully occupied than they were. The spread of live stock over them cannot bring an increase of numbers, such as took place when so much new pasturage had to be occupied.
5. The special causes for the rapid growth of the supply of beef and mutton for the last twenty years being thus at an end, the only question is whether the increase of population, with or without an increased consumption per head, is likely to go on. I am sure the increase of population will, although the consumption per head is not so likely to take the form of an increased weight consumption per head as an increased consumption of the good qualities at the expense of the inferior.

From a broad view of the statistics and general history of the last twenty years Sir R. Giffen thinks that the future generally is not without hope for the agriculturist. But some points, such as the probable increase of the consumption of meat, are necessarily most speculative, and he suggests that it is for agricultural experts to form opinions on such points as an increased supply of meat through an improvement of the breed of live stock in countries where there is much room or improvement.

AGRICULTURAL RETURNS OF GREAT BRITAIN

PRELIMINARY STATEMENT for 1897, compiled from the Returns collected on the 4th June; and comparisons with previous Years.

CROPS AND LIVE STOCK.	**1897.**	1896.	1895.	1894.
	Acres.	*Acres.*	*Acres.*	*Acres.*
Wheat	1,889,161	1,693,957	1,417,483	1,927,962
Barley	2,035,790	2,104,764	2,166,279	2,095,771
Oats	3,036,056	3,095,488	3,296,063	3,253,401
Potatoes	504,914	563,741	541,217	504,454
Hay from clover & rotation grasses	2,286,261	2,171,966	2,303,431	2,121,904
Hay from permanent pasture	4,509,977	4,637,923	4,760,074	4,851,759
Hops	50,863	54,217	58,940	59,535
	No.	*No.*	*No.*	*No.*
Cows & Heifers in Milk or in Calf	2,532,379	2,511,675	2,485,820	2,460,086
Other Cattle :—2 Years and above	1,323,230	1,365,057	1,431,525	1,516,672
,, 1 Year and under 2	1,360,741	1,306,313	1,190,368	1,217,145
,, Under 1 Year	1,284,147	1,310,537	1,246,623	1,153,210
TOTAL OF CATTLE	6,500,497	6,493,582	6,354,336	6,347,113
Ewes kept for Breeding	10,006,697	9,925,587	9,663,129	9,668,002
Other Sheep :—1 Year and above	6,219,001	6,427,982	6,334,386	6,342,730
,, Under 1 Year	10,114,742	10,351,760	9,794,680	9,850,768
TOTAL OF SHEEP	26,340,440	26,705,329	25,792,195	25,861,500
Sows kept for Breeding	334,244	393,729	415,210	351,119
Other Pigs	2,008,058	2,485,072	2,469,221	2,038,907
TOTAL OF PIGS	2,342,302	2,878,801	2,884,431	2,390,026

COMPARISONS with 1896 and 1895.

CROPS AND LIVE STOCK.	INCREASE.				DECREASE.			
	Over 1896.		Over 1895.		Under 1896.		Under 1895.	
	Acres.	*Per Cent.*	*Acres.*	*Per Cent.*	*Acres.*	*Per Cent.*	*Acres.*	*Per Cent.*
Wheat	195,204	11·5	471,678	33·3	...	...	...	...
Barley	...	...	...	...	68,974	3·3	130,489	6·0
Oats	...	...	...	...	59,432	1·9	260,007	7·9
Potatoes	...	...	...	...	58,827	10·4	36,303	6·7
Hay from clover	114,295	5·3	...	...	...	...	17,170	0·7
Hay from pasture	...	...	...	...	127,946	2·8	250,097	5·3
Hops	...	...	...	...	3,354	6·2	8,077	13·7
	No.	*Per Cent.*	*No.*	*Per Cent.*	*No.*	*Per Cent.*	*No.*	*Per Cent.*
Cows	20,704	0·8	46,559	1·9	...	...	...	...
Other Cattle, 2 & above	...	...	...	...	41,827	3·1	108,295	7·6
,, 1 & under 2	54,428	4·2	170,373	14·3	...	...	...	...
,, Under 1	...	...	37,524	3·0	26,390	2·0	...	...
TOTAL CATTLE	6,915	0·1	146,161	2·3	...	...	...	...
Ewes	81,110	0·8	343,568	3·6	...	...	...	...
Other Sheep, 1 & above	...	...	...	...	208,981	3·3	115,385	1·8
,, Under 1	...	...	320,062	3·3	237,018	2·3	...	...
TOTAL SHEEP	...	...	548,245	2·1	364,889	1·4	...	...
Sows	...	...	...	...	59,485	15·1	80,966	19·5
Other Pigs	...	...	...	...	477,014	19·2	461,163	18·7
TOTAL PIGS	...	...	...	...	536,499	18·6	542,129	18·8

II.—COUNTY SUMMARY

PRELIMINARY STATEMENT of the ACREAGE under WHEAT, BRITAIN, compiled from the Returns collected on the 4th June,

COUNTIES.	Wheat.		Barley.		Oats.	
	1897.	1896.	1897.	1896.	1897.	1896.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
TOTAL FOR GREAT BRITAIN	1,889,161	1,693,957	2,035,790	2,104,764	3,036,056	3,095,488
ENGLAND - -	1,785 562	1,609,255	1,698,323	1,778,779	1,829,072	1,845,730
WALES - -	53,810	46,973	104,371	107,702	238,510	241,642
SCOTLAND - -	49,789	37,729	233,096	218,283	968,474	1,008,116
ENGLAND.						
BEDFORD - - -	37,898	35,230	21,887	23,402	15,963	15,406
BERKS - - -	38,610	34,102	26,777	28,816	30,484	30,915
BUCKINGHAM - -	35,822	33,864	19,585	22,488	28,402	27,348
CAMBRIDGE - -	95,144	88,326	58,893	63,238	43,948	44,028
CHESTER - - -	13,533	10,035	1,930	1,869	61,940	63,266
CORNWALL - -	27,435	21,734	31,278	32,308	65,006	65,586
CUMBERLAND - -	3,800	3,320	1,953	2,006	77,118	79,522
DERBY - - -	13,844	12,900	6,698	7,116	26,664	26,890
DEVON - - -	65,476	51,887	44,123	47,141	122,169	120,344
DORSET - - -	24,264	21,142	26,951	27,845	27,414	27,420
DURHAM - - -	12,523	11,907	16,316	17,776	36,173	35,653
ESSEX - - -	115,412	109,064	94,279	99,399	55,740	57,097
GLOUCESTER - -	52,990	45,246	28,138	29,727	32,723	31,277
HANTS - - -	64,735	55,602	40,668	45,197	73,216	73,704
HEREFORD- - -	29,197	25,883	20,373	21,548	23,064	22,628
HERTFORD- - -	52,359	49,046	31,803	34,154	33,948	33,350
HUNTINGDON - -	30,494	27,438	21,866	22,261	11,554	11,423
KENT - - -	47,427	47,239	39,502	43,106	47,738	49,169
LANCASTER - -	17,912	12,533	8,827	8,553	73,802	78,149
LEICESTER - -	21,472	20,689	15,502	17,658	25,955	24,792
LINCOLN - - -	174,424	161,197	220,128	223,780	122,345	119,854
LONDON - - -	124	181	47	52	182	135
MIDDLESEX - -	3,547	3,227	1,122	1,256	2,756	2,994
MONMOUTH - -	7,461	5,949	5,278	5,655	8,925	8,785
NORFOLK - - -	134,095	121,702	203,849	209,808	51,296	55,794
NORTHAMPTON - -	43,698	41,322	46,972	50,175	23,381	23,307
NORTHUMBERLAND -	6,543	6,965	33,804	33,466	46,801	47,043
NOTTS - - -	36,500	35,248	40,458	41,282	33,001	32,185
OXFORD - - -	38,902	33,285	42,607	44,840	30,709	30,686
RUTLAND - - -	4,330	4,344	11,121	11,977	3,744	3,924
SALOP - - -	38,552	32,477	50,439	53,762	41,304	42,189
SOMERSET - - -	36,708	29,837	25,656	28,304	27,847	27,821
STAFFORD - - -	23,664	19,591	16,010	19,065	38,883	38,393
SUFFOLK - - -	105,839	97,184	143,655	146,644	35,176	37,804
SURREY - - -	20,254	19,837	8,627	9,799	23,490	23,103
SUSSEX - - -	54,397	53,768	12,319	13,164	61,692	62,901
WARWICK - - -	36,648	33,825	14,629	16,933	29,447	27,486
WESTMORLAND - -	168	207	792	812	16,505	16,722
WILTS - - -	56,569	50,592	40,464	44,298	44,256	44,310
WORCESTER - -	34,747	31,965	10,677	12,104	18,389	17,085
YORK, E. RIDING -	58,194	50,836	77,286	78,268	98,282	102,521
,, N. RIDING -	22,229	19,647	76,964	79,182	78,352	78,564
,, W. RIDING -	47,622	38,882	58,070	58,545	79,288	84,157

—ACREAGE.

BARLEY, and OATS in the several COUNTIES of GREAT 1897, with a COMPARATIVE STATEMENT FOR 1896.

COUNTIES. (*Continued*).	Wheat.		Barley.		Oats.	
	1897.	1896.	1897.	1896.	1897.	1896.
WALES.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
ANGLESEY	330	268	1,732	1,824	21,708	21,495
BRECON	3,704	3,490	4,649	4,830	13,976	14,264
CARDIGAN	5,805	5,360	15,482	15,849	30,905	31,259
CARMARTHEN	8,258	7,692	13,352	13,332	34,297	35,166
CARNARVON	424	326	6,163	6,375	11,679	12,037
DENBIGH	6,128	4,852	14,829	15,623	27,526	28,103
FLINT	4,710	3,797	5,563	6,346	12,613	12,939
GLAMORGAN	5,981	4,858	7,673	8,050	12,946	12,322
MERIONETH	863	701	4,099	4,212	10,046	10,152
MONTGOMERY	10,952	9,846	8,359	8,670	22,800	23,528
PEMBROKE	3,370	2,800	19,015	19,031	27,507	27,790
RADNOR	3,285	2,983	3,455	3,560	12,507	12,587
SCOTLAND.						
ABERDEEN	5	22	29,353	23,528	184,482	191,898
ARGYLL	...	...	1,685	1,768	17,951	18,203
AYR	1,928	1,194	1,402	1,289	45,554	47,175
BANFF	12	1	10,965	9,096	45,980	48,379
BERWICK	2,206	1,451	20,065	19,562	34,286	35,156
BUTE	18	1	90	114	5,239	5,140
CAITHNESS	5	8	1,010	813	33,840	34,113
CLACKMANNAN	366	224	359	394	3,298	3,360
DUMBARTON	1,032	784	223	201	7,047	7,329
DUMFRIES	130	44	630	452	44,526	46,283
EDINBURGH	4,498	3,237	5,040	5,002	23,457	24,820
ELGIN or MORAY	831	560	14,896	14,239	19,993	21,546
FIFE	9,860	7,873	21,863	22,513	39,585	41,500
FORFAR	7,938	7,024	29,413	27,620	48,981	51,564
HADDINGTON	5,773	4,351	14,926	15,531	18,237	18,435
INVERNESS	30	8	7,333	7,049	30,266	30,814
KINCARDINE	445	381	13,070	11,299	28,637	30,295
KINROSS	12	...	435	392	6,242	6,649
KIRKCUDBRIGHT	95	38	62	13	27,543	29,147
LANARK	2,260	1,559	377	259	37,987	39,994
LINLITHGOW	1,392	793	3,172	3,193	9,766	10,542
NAIRN	12	14	3,609	3,257	5,530	5,681
ORKNEY	...	...	4,616	4,539	33,445	33,899
PEEBLES	13	10	315	322	8,071	8,611
PERTH	5,404	4,222	14,380	13,251	65,079	68,991
RENFREW	1,788	1,320	135	167	11,688	12,259
ROSS and CROMARTY	694	518	12,977	12,047	29,864	31,468
ROXBURGH	510	325	12,667	12,383	29,288	30,373
SELKIRK	5	...	367	309	4,914	5,227
SHETLAND	...	...	2,002	2,029	7,312	7,326
STIRLING	2,013	1,355	3,319	3,316	18,423	19,178
SUTHERLAND	...	...	1,365	1,489	7,920	8,137
WIGTOWN	514	412	975	847	34,043	34,624

II.—COUNTY SUMMARY.

PRELIMINARY STATEMENT of the ACREAGE under POTATOES from the Returns collected on the 4th June, 1897,

COUNTIES.	Potatoes.		Hay FROM CLOVER AND ROTATION GRASSES.		Hay FROM PERMANENT PASTURE.	
	1897.	1896.	1897.	1896.	1897.	1896.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
TOTAL FOR GREAT BRITAIN	504,914	563,741	2,286,261	2,171,966	4,509,977	4,637,923
ENGLAND	352,365	400,104	1,692,908	1,601,537	3,901,207	3,967,426
WALES	32,609	33,848	196,251	177,455	473,725	500,565
SCOTLAND	119,940	129,789	397,102	392,974	135,045	169,932
ENGLAND.						
BEDFORD	7,118	9,413	16,557	13,915	33,046	32,924
BERKS	1,898	2,247	35,442	33,612	72,016	74,057
BUCKINGHAM	1,488	1,849	27,000	26,027	92,066	90,339
CAMBRIDGE	19,847	22,352	35,346	33,525	40,319	42,403
CHESTER	23,252	25,432	60,363	56,047	93,151	100,048
CORNWALL	5,376	5,582	49,214	41,907	32,817	38,822
CUMBERLAND	8,358	9,117	44,025	42,119	69,679	72,566
DERBY	2,391	2,508	20,552	18,672	132,971	132,928
DEVON	11,856	11,756	74,014	70,413	114,146	117,314
DORSET	1,719	1,826	31,073	30,345	92,930	90,847
DURHAM	7,650	8,519	41,659	39,845	91,459	92,418
ESSEX	9,905	13,084	70,621	62,068	109,403	112,276
GLOUCESTER	4,079	4,477	52,956	53,388	154,436	145,225
HANTS	5,976	6,772	86,802	85,513	90,402	96,379
HEREFORD	1,835	2,066	24,517	23,906	76,546	77,686
HERTFORD	3,566	4,945	35,940	33,724	57,952	60,142
HUNTINGDON	7,708	9,647	12,331	11,088	25,321	27,927
KENT	13,067	16,018	40,813	36,840	105,787	109,377
LANCASTER	37,053	39,586	74,749	68,905	197,873	209,347
LEICESTER	2,071	2,432	19,703	17,417	92,975	90,021
LINCOLN	50,197	57,658	92,151	86,452	97,410	107,990
LONDON	451	545	208	235	3,953	4,356
MIDDLESEX	2,695	3,498	1,765	1,853	49,623	50,205
MONMOUTH	1,422	1,527	11,512	11,365	67,232	64,897
NORFOLK	8,318	8,420	133,850	127,452	53,761	67,666
NORTHAMPTON	2,806	3,384	26,539	22,989	79,725	80,400
NORTHUMBERLAND	4,122	4,555	45,192	43,204	69,743	70,189
NOTTS	7,345	8,011	28,228	28,013	63,740	64,909
OXFORD	2,452	2,857	35,880	35,030	72,784	72,575
RUTLAND	159	148	3,265	1,989	11,525	11,140
SALOP	6,263	6,936	46,607	43,911	100,155	101,453
SOMERSET	4,737	4,993	29,403	27,275	242,169	225,549
STAFFORD	9,631	11,129	33,467	32,410	124,612	120,922
SUFFOLK	2,441	2,988	68,443	62,080	65,096	72,432
SURREY	5,937	7,055	20,434	18,358	72,882	73,265
SUSSEX	3,422	3,559	45,468	45,148	129,338	132,256
WARWICK	6,154	7,064	27,093	26,879	99,211	97,372
WESTMORLAND	1,318	1,530	7,892	7,004	52,852	55,044
WILTS	2,640	2,851	59,024	59,010	145,948	139,318
WORCESTER	7,715	9,273	17,306	18,217	90,917	91,267
YORK, E. RIDING	11,985	13,767	21,413	23,109	37,249	41,965
,, N. RIDING	10,790	12,128	37,860	35,061	135,988	139,765
,, W. RIDING	23,152	26,600	46,231	45,217	259,999	269,445

—ACREAGE.

and HAY in the several COUNTIES of GREAT BRITAIN, compiled with a COMPARATIVE STATEMENT for 1896.

COUNTIES. *(Continued.)*	**Potatoes.**		**Hay** FROM CLOVER AND ROTATION GRASSES.		**Hay** FROM PERMANENT PASTURE.	
	1897.	1896.	1897.	1896.	1897.	1896.
WALES.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
ANGLESEY	2,704	2,841	20,194	15,785	13,450	19,998
BRECON	1,090	1,131	8,029	7,361	37,263	37,084
CARDIGAN	5,936	6,091	20,635	18,677	36,432	39,218
CARMARTHEN	3,677	3,752	18,338	17,169	77,388	77,581
CARNARVON	4,406	4,616	20,674	18,452	39,726	45,446
DENBIGH	3,207	3,408	25,247	22,372	32,165	37,364
FLINT	2,260	2,547	14,002	12,405	17,227	19,757
GLAMORGAN	1,914	1,940	16,412	15,974	71,231	71,685
MERIONETH	1,859	1,901	8,379	7,433	36,174	37,388
MONTGOMERY	2,143	2,083	17,863	16,969	45,985	46,547
PEMBROKE	2,503	2,630	18,815	17,653	42,498	44,167
RADNOR	910	908	7,663	7,205	24,186	24,330
SCOTLAND.						
ABERDEEN	7,073	7,365	44,786	47,053	1,443	3,116
ARGYLL	4,727	4,804	11,312	11,001	12,721	14,346
AYR	7,158	8,498	29,903	27,910	17,715	21,260
BANFF	1,958	1,984	9,139	10,137	1,209	1,956
BERWICK	2,271	2,462	9,091	9,373	2,281	3,625
BUTE	949	1,043	2,161	2,054	364	989
CAITHNESS	1,623	1,652	8,766	9,288	1,416	2,991
CLACKMANNAN	266	334	1,623	1,568	519	701
DUMBARTON	2,149	2,214	6,728	6,538	1,906	2,853
DUMFRIES	3,391	3,717	18,275	18,447	18,175	18,931
EDINBURGH	4,542	4,984	13,084	12,564	2,029	2,959
ELGIN, or MORAY	1,641	1,648	5,680	5,581	1,278	1,462
FIFE	13,326	14,855	27,999	25,291	4,856	8,197
FORFAR	11,429	12,341	20,088	20,468	1,952	2,043
HADDINGTON	7,205	7,952	10,766	9,648	871	2,313
INVERNESS	5,744	5,903	11,196	11,581	5,120	5,866
KINCARDINE	2,190	2,590	12,475	12,468	111	300
KINROSS	517	573	2,665	2,574	759	810
KIRKCUDBRIGHT	1,436	1,478	8,983	9,756	12,134	12,607
LANARK	3,573	4,075	34,641	32,921	8,976	12,057
LINLITHGOW	1,411	1,641	7,066	6,455	952	1,715
NAIRN	327	316	1,546	1,943	252	400
ORKNEY	2,749	2,845	7,388	10,634	1,086	1,214
PEEBLES	335	368	2,146	2,566	1,727	1,834
PERTH	11,416	12,560	30,637	28,622	9,347	13,252
RENFREW	2,951	3,107	14,116	12,514	5,048	6,950
ROSS and CROMARTY	7,343	7,572	13,792	13,150	1,949	3,978
ROXBURGH	1,249	1,373	9,044	9,380	8,145	7,758
SELKIRK	203	229	1,036	895	1,146	1,527
SHETLAND	3,136	3,158	694	687	1,475	1,658
STIRLING	2,696	3,004	12,076	12,074	3,416	4,540
SUTHERLAND	1,628	1,639	4,131	3,634	1,109	1,601
WIGTOWN	1,328	1,505	4,069	4,199	3,558	4,123

II.—COUNTY SUMMARY.

PRELIMINARY STATEMENT of the NUMBER of CATTLE, SHEEP, from the Returns collected on the 4th June,

COUNTIES.	Cattle.		Sheep.		Pigs.	
	1897.	1896.	1897.	1896.	1897.	1896.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
TOTAL FOR GREAT BRITAIN	6,500,497	6,493,582	26,340,440	26,705,329	2,342,302	2,878,801
ENGLAND	4,567,834	4,573,603	15,721,213	16,031,095	1,990,534	2,476,488
WALES	709,120	712,979	3,195,359	3,207,815	216,447	257,698
SCOTLAND	1,223,543	1,207,000	7,423,868	7,466,419	135,321	144,615
ENGLAND.						
BEDFORD	30,641	30,398	99,089	94,966	25,435	31,658
BERKS	41,582	40,602	175,228	182,240	24,590	34,484
BUCKINGHAM	68,688	68,077	194,654	197,409	29,760	40,155
CAMBRIDGE	49,935	49,645	210,400	209,305	49,818	58,555
CHESTER	174,367	174,586	95,073	103,434	66,222	75,034
CORNWALL	195,917	199,825	408,281	427,666	76,816	102,381
CUMBERLAND	143,685	140,517	566,487	550,404	20,513	23,901
DERBY	137,238	137,357	183,227	183,241	29,021	38,923
DEVON	269,057	268,089	860,901	906,401	92,633	120,928
DORSET	83,004	86,433	353,483	378,221	52,413	66,288
DURHAM	72,907	74,105	244,914	242,761	11,122	13,801
ESSEX	83,610	83,609	295,288	292,090	90,559	113,250
GLOUCESTER	114,968	115,669	347,072	360,200	68,416	83,993
HANTS	81,121	80,471	375,696	390,115	67,329	88,097
HEREFORD	87,490	90,190	309,561	320,819	23,294	31,409
HERTFORD	33,158	32,013	119,421	119,987	25,976	34,329
HUNTINGDON	28,673	28,417	100,399	99,771	18,595	22,650
KENT	76,447	70,035	934,698	905,709	57,135	69,706
LANCASTER	230,462	231,729	320,209	328,423	53,449	61,870
LEICESTER	131,253	129,888	322,890	317,350	24,397	33,291
LINCOLN	239,947	237,592	1,167,676	1,176,653	96,121	117,646
LONDON	6,079	6,323	5,175	4,471	2,939	3,475
MIDDLESEX	17,274	16,528	19,024	22,603	13,535	15,058
MONMOUTH	45,283	46,050	204,350	212,974	14,585	19,010
NORFOLK	123,760	125,106	517,430	526,520	96,596	117,903
NORTHAMTON	118,504	117,377	409,534	411,923	27,590	38,150
NORTHUMBERLAND	106,517	110,766	1,049,232	1,045,794	10,256	12,687
NOTTS	80,627	80,364	220,602	226,088	27,077	35,155
OXFORD	55,861	55,203	232,493	244,578	32,053	43,625
RUTLAND	17,244	17,392	82,183	82,877	2,153	3,031
SALOP	167,217	170,033	451,574	474,591	59,519	74,787
SOMERSET	222,207	225,914	528,534	544,698	119,475	137,154
STAFFORD	153,635	154,527	246,702	255,576	46,164	62,866
SUFFOLK	68,618	68,585	391,027	400,732	146,412	165,636
SURREY	43,297	43,677	79,433	81,143	22,006	28,333
SUSSEX	110,775	107,065	433,695	447,015	40,293	48,917
WARWICK	99,863	98,295	280,724	287,980	36,629	48,782
WESTMORLAND	65,088	65,771	373,698	370,725	3,999	5,057
WILTS	107,529	108,563	509,944	547,617	67,154	79,830
WORCESTER	63,088	62,378	167,583	172,569	40,723	50,589
YORK, E. RIDING	87,485	85,973	450,560	468,552	51,209	62,551
,, N. RIDING	169,546	170,799	707,872	710,795	46,676	59,735
,, W. RIDING	264,187	267,667	675,197	704,109	79,877	101,808

—LIVE STOCK.

and PIGS in the several COUNTIES of GREAT BRITAIN, compiled 1897, with a COMPARATIVE STATEMENT for 1896.

COUNTIES. (*continued.*)	Cattle.		Sheep.		Pigs.	
	1897.	1896.	1897	1896.	1897.	1896.
WALES.	No.	No.	No.	No.	No.	No.
ANGLESEY	51,260	50,590	71,129	64,870	15,499	18,169
BRECON	39,253	39,818	475,868	479,002	8,213	9,914
CARDIGAN	65,773	66,000	253,792	246,327	21,722	24,763
CARMARTHEN	115,800	117,723	253,397	254,817	33,570	39,390
CARNARVON	55,729	54,572	256,395	256,313	21,437	22,905
DENBIGH	66,012	67,142	303,676	313,405	25,642	30,321
FLINT	35,062	35,528	72,767	77,075	16,175	19,830
GLAMORGAN	51,668	52,628	304,359	308,475	15,298	19,295
MERIONETH	37,885	37,785	411,570	405,791	7,957	9,564
MONTGOMERY	70,766	70,386	389,473	393,946	20,299	25,580
PEMBROKE	88,546	89,014	130,064	130,577	25,845	32,429
RADNOR	31,366	31,793	272,869	277,217	4,790	5,538
SCOTLAND.						
ABERDEEN	179,153	178,791	216,080	190,431	10,721	11,461
ARGYLL	62,177	61,147	1,015,088	1,050,969	4,472	4,380
AYR	101,013	100,286	379,551	373,274	15,376	14,776
BANFF	43,960	43,790	68,245	63,809	2,696	2,986
BERWICK	16,356	16,018	319,543	312,863	3,632	4,318
BUTE	9,967	9,775	48,577	49,643	788	935
CAITHNESS	22,781	22,488	113,806	116,748	1,516	1,790
CLACKMANNAN	4,173	4,056	14,299	14,887	2,122	2,744
DUMBARTON	15,686	15,251	76,156	78,644	1,604	1,605
DUMFRIES	60,448	58,357	551,656	544,253	9,239	10,636
EDINBURGH	21,175	20,782	186,164	189,261	6,545	7,291
ELGIN, or MORAY	23,186	22,797	67,592	64,614	2,767	2,921
FIFE	50,703	49,632	109,756	105,918	5,482	5,955
FORFAR	52,950	53,245	157,937	157,010	6,672	7,272
HADDINGTON	10,588	9,190	125,354	124,369	1,654	2,068
INVERNESS	53,375	52,814	639,917	661,099	2,617	2,763
KINCARDINE	27,388	27,052	44,526	39,952	2,470	2,624
KINROSS	6,830	6,561	37,374	38,650	410	499
KIRKCUDBRIGHT	48,049	46,472	400,823	394,422	6,695	7,284
LANARK	73,518	71,703	244,072	240,771	7,547	7,540
LINLITHGOW	12,179	11,982	26,802	27,735	1,380	1,767
NAIRN	6,413	6,297	20,446	19,666	722	683
ORKNEY	29,422	28,397	37,805	35,228	2,850	3,845
PEEBLES	7,096	7,023	185,396	190,861	630	705
PERTH	78,270	78,003	720,334	730,950	7,769	8,228
RENFREW	26,420	26,205	42,974	41,197	1,507	1,591
ROSS and CROMARTY	44,641	44,932	329,758	326,754	5,101	5,360
ROXBURGH	17,054	16,929	517,887	522,906	3,282	3,730
SELKIRK	3,002	3,069	183,691	185,800	496	445
SHETLAND	18,914	19,069	92,570	105,327	2,895	2,918
STIRLING	34,475	33,354	120,649	131,609	2,410	2,479
SUTHERLAND	12,578	12,500	201,244	210,742	963	1,049
WIGTOWN	49,603	49,033	127,796	126,057	10,291	9,967

INJURIOUS INSECTS AND FUNGI.

The Asparagus Beetle (*Crioceris Asparagi*).

This beetle often does much harm to asparagus, especially in beds which have been established from one to three years, by eating and disfiguring the heads as they are formed, and later on by attacking the stems and seeds, of which it is particularly fond, both in the beetle and larval stages. In the beetle stage these insects bite the tender asparagus heads while these are yet underground, or only just showing above the ground, making brown patches upon them, and spoiling their appearance for market. Later on the beetles also eat the feathery shoots of the plants, as well as the large round seeds, to which they are very partial. A beetle will eat a considerable quantity of the tender feathery shoots in the course of a day. The larvæ are also most voracious, and sometimes, in bad cases of infestation, the long stems of the plants are left completely bare of foliage by successions of larvæ.

The Asparagus Beetle is common in the southern, eastern, and western parts of England, but it is rarely found in the northern districts. Canon Fowler, in his Coleoptera of the British Isles, states that he does not know of a record from any locality farther north than South Derbyshire. It is known in France,* Germany, and Italy, and probably throughout Europe.

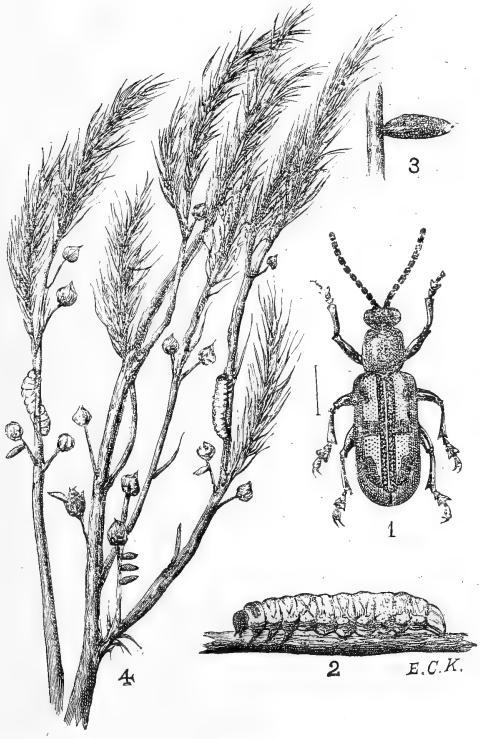
In the United States, where it was introduced from Europe in 1858, it has spread very rapidly. It was first seen at Astoria, in Long Island, where asparagus is largely grown, and by the year 1862 the beetle had spread throughout the asparagus beds of Long Island.

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* Boisduval says that the asparagus growers of Argenteuil, in France, complain that it is very detrimental to their asparagus culture.

Life History.

The beetle (Fig. 1) is about a quarter of an inch long and comparatively narrow in width. Its body is shiny black, with a blue tinge; its head is black; its ten-jointed antennæ are dark brown; its thorax is red, with two black marks or lines



1. Beetle, line showing natural size; 2. Larva, magnified; 3. Egg, magnified; 4. Asparagus plant.

upon it; and its wing-cases have outer margins of orange-colour and black inner margins, and there is a transverse bar of black across them. Upon each wing-case there is a row of three yellowish or lemon-yellowish spots, or patches, which, with the transverse bar and the black margins, form the figure of a cross, hence the beetle is termed "Cross-bearer" (the French call it "Porte-Croix").

Eggs are laid by the beetles in the early spring upon the heads, shoots, and feathery foliage of the asparagus plants.

The eggs are brown, long, and somewhat cylindrical, being glued by their ends to the plants, usually in rows of three to five, but frequently they are placed singly. Larvæ come forth in from eight to ten days, and immediately begin to feed upon the asparagus. The larval stage lasts for fourteen days, or for about this period, when the larvæ fall to the earth and undergo transformation just beneath its surface in a slight cocoon. The number of broods appears to depend upon the weather and the supply of food. Beetles and larvæ are frequently found upon the plants until the middle of October.

The larva (Fig. 2), which is about the fifth of an inch in length when extended, is of a dark olive-green colour, and usually has a black mark upon its back. It is thick, fleshy, and somewhat slimy, with a shiny black head and three pairs of shiny black legs; the lower end of its body is unusually prolonged to help locomotion and to enable the larva to cling to the stems and shoots of the asparagus. There are also two rows of tubercles along the body, which have the appearance of rudimentary pro-legs.

It has not been definitely decided whether this insect hibernates in this country in beetle or pupal form, but the evidence tends to show that here, and in other European countries, it exists during the winter in the latter form. The majority of the American entomologists, including Fitch and Lintner, hold that the winter is passed in beetle form. Dr. Lintner says:—"The beetles destined to continue the species survive the winter in dry sheltered places, as beneath bark, in crevices of wood, and under the boards of buildings."

If hibernation takes place in the pupal form in England, the transformation takes place very early, as the beetles attack asparagus plants directly they shoot, and before the heads are above the ground, and, as is well known, asparagus begins to shoot after the first two or three warm days in spring.

Methods of Prevention and Remedies.

In the first stages of this attack, that is, when the beetles are underground and feeding upon the juicy parts of the heads of the asparagus as they are formed, it is difficult to

deal with them, though at this period they do considerable harm by making the heads brown and spotty. It is desirable to leave a few heads uncut in every bed where there is infestation as traps for the beetles, which get up the feathery shoots and branches during the day for pairing and the deposition of eggs. In the course of eight or nine days these plants should be cut off close to the ground, and burnt. Other heads should be allowed to run to shoots, which should also be cut off and burnt.

Beds of young asparagus plants are most liable to this attack before cutting begins or when only the strongest heads are cut, as the beetles like the succulent shoots of young plants. It would seriously injure the stock in newly-made beds to cut off their shoots, even though badly infested. In such cases, it would be better to brush the feathery shoots smartly with sticks, and to tread heavily round the plants to crush the larvæ. Very finely powdered lime dusted on infested plants would also be efficacious, as it would adhere to the slimy bodies of the larvæ. The lime should be applied as soon as larvæ are noticed, and the application repeated at intervals. In small beds, and in beds of young plants, hand-picking, both of beetles and larvæ, would be useful, but this operation is too costly where asparagus is largely cultivated. In extensive beds the remedies to be employed are the liming, and beating of infested plants, and trapping, as indicated above, by letting some heads grow into plants. Syringing can be adopted in gardens where asparagus is grown upon a large scale; this process is more difficult, as the plants are not set in rows, but it may be effected by means of knapsack-spraying machines. Kerosene emulsion, consisting of two gallons of kerosene oil and half a pound of soft soap dissolved in a gallon of soft water, may be used for spraying purposes. The soap should be boiled, and while boiling the kerosene should be poured into it and churned up with the soap until it is thoroughly incorporated. The mixture should then be diluted with ten gallons of water.

Paris green is also a valuable remedy against these and other insects which feed upon foliage. It may be used at the rate of one pound of Paris green to 200 gallons of water. It

is better to put one pound of fresh lime with the Paris green. This mixture can also be put on with a knapsack machine.

Spraying should be carried out early in the season before the foliage has become thick and strong. It will be necessary to repeat this operation, and it would be effective against both beetles and larvæ.

THE PEA THRIPS (*Thrips Pisivora*).

Complaints were made by pea-growers in Essex in the summer of 1896 of injury caused to pea-plants by an insect said to be a species of Thrips. Some injured pea-plants and specimens of an insect found upon them were received by the Board of Agriculture early in July, 1896, and the insect sent with them proved to be the Pea Weevil, *Sitones lineatus*, and not a species of Thrips.

Again, in July, 1897, information was received by the Board that the Thrips insect was spoiling the pea crop in parts of Essex. No specimens were received, and it was assumed that the Pea Weevil was the offender; but about the same time injured pea plants were submitted by growers of peas in fields and gardens in Kent which were infested by a species of Thrips. The haulm in these cases was fully developed, and in many instances it was luxuriant (as much of the pea-haulm was in the early summer of this year), but flowers and pods were generally wanting. Here and there a plant was found having a few aborted flowers with dried up calyces and shrivelled petals, and an occasional pod was seen without the sign of a pea in it, distorted and prematurely browned by the punctures of the Thrips.

It appeared that the continuous sucking action of numbers of this insect and its larvæ had prevented the fructification of the plants, and in most cases had completely arrested the formation of flowers and pods, the insects having arrived on the scene just at the time when the flowers began to form and the haulm was in full vigour. Where the flowers and pods should have been there was a shapeless mass of

"pungled matter," which is the expressive term applied by Curtis to wheat plants similarly affected by another species of Thrips, known as *Thrips cerealium*.

Thus, there was the unusual spectacle of whole rows of pea-plants of over average size, good colour, and apparent health, without flowers and pods, and utterly useless. Upon examination by a casual observer, the insects would hardly be discovered, as they are very minute, and if noticed they might very naturally be regarded from their size as too insignificant to cause such wholesale mischief.

Life History.

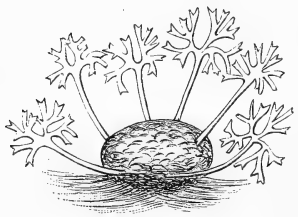
The Thrips found in these pea-plants is probably the same species of Thrips as that observed and described by Westwood as infesting and injuring pea-plants in precisely the same manner as has been described above. Westwood regarded this as an unnamed species, and styled it *Thrips pisivora*, and from his figure and descriptions it seems probable that it is identical with the specimens forwarded to the Board of Agriculture. In size it is hardly the twelfth of an inch in length when full grown, and in the larval state it is not quite so long. The insect is greyish yellow in colour without wings, and possesses seven-jointed hairy antennæ, four of the upper joints being yellowish and the lower ones black. The eyes are red, and the mouth is furnished with a short fleshy sucking apparatus; there are three pairs of legs, with feet shaped like bladders, which is characteristic of some species of *Thripidæ;* and at the end of the body there is a brown or reddish brown ovipositor. The winged specimens of the Thrips found on the pea-plants were darker in colour, and had two pairs of wings with long fringes, folded down the whole length, and extending beyond the body. Westwood, in his description of the pea thrips, evidently holds that the females of this species are wingless, as he says, "We met with no males, unless indeed a very few other black fully winged specimens may be of that sex." In the case of some species of Thrips, as *Thrips cerealium*, for instance, the males are wingless. The female places eggs of microscopic size close to the midribs of the leaves, from which

the larvæ come in seven or eight days, and at once begin to suck up the juices of the plant. There are many generations during the summer. The winter is passed in the perfect state in the earth, or in the bark of trees and other similar shelters.

Methods of Prevention and Remedies.

After an attack of this insect, peas should not be sown in the following year near the infested spot. In gardens where peas are trained upon pea-sticks it would be possible to spray the plants by means of a knapsack machine; but in fields where sticks are not used, and the foliage grows densely, this would be almost impracticable. The best mixtures for spraying would be 6 lbs. of soft soap and the extract of 5 or 6 lbs. of quassia chips to 100 gallons of water.

GOOSEBERRY BLIGHT (*Microsphæria Grossularia*).



Perithecium with branching filaments; much magnified.

This fungus has been unusually troublesome this season, and has caused many of the leaves of gooseberry bushes to shrivel and fall off. Upon casual inspection of the bushes in the early stages of the disorder, the upper and under sides of the leaves look as if they were covered with white dust, or had been powdered with fine lime or sprayed with lime-wash. Under the microscope it is seen that there is a dense covering, which has been aptly termed a "felt-like coating," of slender white or greyish-white threads on both sides of the leaves. These form the mycelium of the fungus, which does not, like the potato fungus, live within the plant, but merely sends down short branches—suckers or *haustoria*—into the cells of the leaves. Upon these threads, or filaments, summer spores,

or conidia, are first formed, which are borne by the wind from plant to plant and spread the disorder. Later on, the winter spores, or resting spores, are formed, to carry the fungus on through the winter. These are imperceptible with the naked eye, but they may be seen with a glass late in July and during the autumn in the form of dark brown bodies upon the "felt-like coating." Upon examination of these bodies with the microscope these are seen to be nearly globular with cross markings on their surface, and bearing from seven to eight slender, colourless filaments, with ends somewhat fantastically branched, as shown in the figure. It is supposed that these branched filaments keep the *perithecia* in place upon the mycelium on the leaves. The *perithecia* contain from four to eight *asci*, nearly oval cases, in each of which there are four or five spores. When the leaves fall the *perithecia* fall with them, and remain upon the ground or on the decaying leaves until the spring, when the *asci* burst and the spores are liberated and speedily germinate in favourable conditions.

An allied species of fungus causes very much more serious injury to gooseberry bushes in the United States, so that it has lately been found almost impracticable to grow there the finer varieties introduced from other countries. The appearance and life history of this fungus are very similar to those of the *Microsphæria Grossularia*, except that the former infects the fruit as well as the leaves.

Prevention and Remedies.

The leaves from infected bushes should be raked from under and round them and burnt. The ground round the bushes should be dug or hoed deeply to bury the *perithecia*, and when the bushes are cut in the winter, every piece of cutting should be raked up and burnt. Any dead leaves remaining on infected trees should be, as far as possible, picked off and burnt.

Where there is a sign of infection the leaves should be dusted thoroughly above and below with very finely powdered sulphur put carefully on with a knapsack powder-distributor on a still, hot, sunny day.

Sulphide of potassium diluted with water in the proportion of $2\frac{1}{2}$ ounces of sulphide to five gallons of water, and sprayed over and under the leaves in a fine spray, has been found to be efficacious. This dressing should be applied very early when the leaves are small and young, and should be repeated in about sixteen days.

The Bordeaux mixture, as used for potato-disease, may be used with advantage—sprayed on by means of a knapsack sprayer in a very fine spray when the leaves are fully formed. The mixture should be made of 3 lbs. of sulphate of copper and 3 lbs. of lime to 25 gallons of water. If used later in the season, when the foliage is strong and fully developed, 4 lbs. of sulphate of copper and 4 lbs. of lime may be employed with 25 gallons of water. But care must be taken in the use of these applications when the gooseberries are large and intended for early picking.

THE APPLE-BLOSSOM WEEVIL (*Anthonomus Pomorum*).

(*See Coloured Plate.*)

This insect frequently causes much harm to apple and pear trees. In the last four or five years its injuries have much increased in fruit-producing districts, and in some instances they have been attributed to the caterpillars of the Winter Moth. Close examination of the blossoms has, however, shown that the larvæ, or maggots, of the weevil were in the centres of the flowers, destroying their powers of fructification, though at the same time caterpillars were feeding upon the blossoms and leaves. The action of this weevil upon the fruit blossoms of apple and pear trees is often mistaken for the effects of white frosts, when the petals have become brown or rusty-coloured; but if they are closely examined either the pupa of the weevil will be found within them, or a round little hole in the side of the withered flower-bud will be noticed, showing that the perfect weevil has cut its way out of its cradle.

Description of the Weevil.

The apple-blossom weevil is a very small creature, only about one-fourth of an inch long, and not the eighth of an inch across its body. Its body is usually reddish, or chestnut brown, in colour, and covered with down, or pubescence, of a greyish hue; but some specimens are almost piceous. The wing-cases have pale marks upon them below the middle, and there is a conspicuous white mark, or scutellum, at their base; the legs are reddish; the thighs of the anterior, or first, pair are large, and furnished with a formidable tooth on each; and the teeth, or tarsi, are darker coloured. The rostrum, or snout, is the most remarkable feature, being half as long as the body; it is slightly curved, with antennæ near its extremity, and furnished with oval clubs having four joints.

Like other insects of the same family, the apple-blossom weevil falls down when disturbed, tucks in its snout and legs, and remains motionless, feigning death until the danger has passed.

Its Life History.

In the first warm days of spring the weevil issues from its winter retreat, which is usually under the bark of trees, or among lichens and mosses upon the branches, or under stones, grass, leaves, and rubbish lying under trees. Curtis and Schmidberger consider that the females seldom use their wings, but that the males fly freely. Dr. Henneguy, to whom a special mission was entrusted by the French Minister of Agriculture to fully investigate the habits of this insect in Brittany, states that both sexes fly easily, and with equal frequency.*

Either by flying, or by crawling, the female finds her way to the blossom-buds of apple and pear trees, bores a hole with her snout, places one egg within each bud, and carefully closes up the aperture. This is the mode of oviposition described by Curtis and other economic entomologists. M. Petit, Departmental Professor of Agriculture in Morbihan, who has studied this insect, states, however, that the female

* *Rapport sur l'histoire naturelle de l'anthonome du pommier, et sur les moyens proposés pour sa destruction*, par le Dr. F. Henneguy. Bulletin du Ministère de l'Agriculture. France, No. 8, Décembre 1891.

does not perforate the flower-buds with her snout for egg deposition, but with a stylet placed in the extreme end of her body like a bee's sting.* M. Petit remarks that by pressing the body of a female weevil this stylet is protruded, and can be seen with a glass. "It is hard to admit," he adds, "that the insect should execute a complicated manœuvre obliging it, after having pierced the bud with its snout, to turn round and place the egg in an invisible hole, smaller than the egg."

A female lays from fifteen to twenty eggs, but places one only in each flower-bud. The process of laying one egg takes about three-quarters of an hour. The egg is yellowish-white and oval. Authorities agree that the period of egg laying in an individual female may be continued for at least a fortnight. The eggs are hatched in from five to nine days, according to the conditions of the temperature.

The larva, or maggot, is without feet, about four lines long —the third of an inch—when full grown. It is wrinkled, and white at first, gradually becoming of a yellowish hue, having a brown head with two little brown spots on the first segment. It lies in the bud in a curved form, and attacks the stamens and pistils, but rarely touches the ovary. It soon causes the petals to wither, and the flower-bud changes to a rusty hue and decays.

The larva turns into a pupa, close upon a quarter of an inch long, yellowish-white, with its long rostrum, or snout, and its feet folded on the under side of its body. It remains in pupal state for about ten days, when it assumes the weevil form and emerges by boring a hole through the petals.

Most practical entomologists have held that the weevils live during the summer by feeding upon the leaves of apple trees. Dr. Henneguy, from close observation, has come to the conclusion that they do not feed at all, but derive sustentation from a reserve of fat, *corps graisseux*, stored up in their bodies during the pupal state. Towards the end of September the weevils can no longer be seen. They retire for hibernation to the chinks in the bark of apple and pear

* *Guerre à l'Anthonome*, par P. Zipcy, Professeur à l'Ecole d'Agriculture du Morbihan. Journal d'Agriculture Pratique, 1892, Tome I., No. 1. 7 Janvier.

trees, also in the lichenous and mossy growths upon their branches, as well as under stones and rubbish beneath and around the trees, and possibly in many other refuges. They also pass the winter under the bark of other trees, as they have been found upon oaks during the summer.

Circumstances of the Attack.

According to the natural and unfailing instinct of insects, the weevils do not appear until the weather is mild and the flower-buds have begun to swell. If the season is, and continues, warm, the effects of the attack are usually of a comparatively slight character. But should the weather be cold and changeable, as is so often the case in Great Britain, and in the northern and western parts of France, the flower-buds are slowly developed, so that the weevils have time to lay their full complement of eggs, and the period of hatching is accomplished before the buds have become full flowers.

The varieties of apple trees which blossom very early and very late are more likely to escape the attacks of the weevil than those of the main crop which come into blossom late in May in ordinary seasons.

Remedies and Methods of Prevention.

A method of prevention adopted in France and strongly recommended by M. Petit, is to spray the limbs and branches of apple trees between October and February with a solution of sulphate of iron, in order to destroy the lichens and mosses which serve as harbours for the weevils and other insects.* M. Petit's receipt for this solution is one pound of sulphate of iron to one gallon of water. This can be sent up among the branches by means of a strong garden engine with a powerful pump.

A most excellent way of killing lichens and mosses on fruit trees, adopted in Kent, is to throw freshly slaked powdered lime over the branches in foggy weather in winter. This is done by men having scoops like flour scoops fastened to poles.

* This treatment with sulphate of iron would materially benefit the trees by clearing them of lichenous and mossy growths.

It is recommended that all long grass, leaves, and rubbish should be cleared away underneath fruit-trees on grass land, and on cultivated land it would be well to dig round the trees and apply lime or lime ashes, or soot and lime mixed.

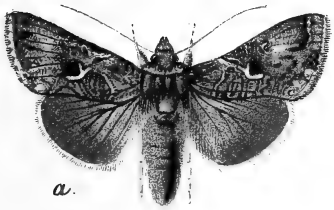
The tarred, or greased, bands put round the fruit-trees to prevent the ascent of the female winter moths would hinder the female weevils from ascending, assuming that Curtis, Schmidberger, and others are correct in their opinion that the female weevils crawl up the trees and do not fly.

In Brittany some apple-growers scrape the bark of the trunks and large branches of the apple-trees with a scraper, and brush every part with a stiff carpet brush, having placed a cloth round the tree to catch the pieces of bark and the beetles that are dislodged. These are collected and burnt. Some limewash the trunks and limbs after this process; others apply a composition of lime and naphthaline, but this is said to be not quite effectual in keeping away the weevils.

In Great Britain it has been found that limewashing trees is not effective against insects unless the bark is thoroughly cleared off and the wash worked well into every cranny while it is fresh and hot.

Insecticides have been tried in France at the time of flowering, but without good results. Sulphur is burnt in a vessel at the end of a pole, and applied close under the branches of the trees. It takes, it is said, about a quarter of an hour to treat one tree, at a cost of about 5d. This process is said to have answered in some cases, but experiments made at Rouen and Saint Ouen de Thouberville proved far from encouraging. It is most difficult to employ insecticides with advantage, as compositions strong enough to kill or drive away the weevils would probably injure the tender buds, and after the larva is in the bud it is hopeless to attempt to reach it.

A method of keeping down the number of these weevils, adopted in parts of France and recommended by several who have practised it, is to shake the branches of the trees to make the insects fall on to a cloth spread below. The cloth, an old rickcloth being best, is cut and arranged so as to fit



a.



b

The Y Moth. (Plusia gamma.)

a. Moth: nat. size. *b. Larva: nat. size.*



1



3



2

Apple Blossom Weevil.

(Anthonomus pomorum)

1. Pupa. × 6.
2. Larva. × 8.
3. Weevil. × 7.

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NATURAL HISTORY

close round the trunk of the trees. A labourer gets up into the tree and shakes the branches violently, while two others, having long poles with hooks at the ends, also shake the branches within their reach. Other labourers sweep the cloth with stiff carpet brooms, and shovel up the débris together with the weevils into a sack. This must be done rapidly, and before the weevils can fly away.

Experiments have shown that it is necessary to perform this operation two or three times on each tree, as the weevils are not all shaken off at first. From a tree, for instance, which at the first shaking nearly 1,000 weevils had fallen, 385 were shaken off five hours later, and 145 the next day. In the orchard of the École pratique d'Agriculture des Trois Croix, near Rennes, with 347 apple-trees on eight acres, the cost of treatment, which occupied three days, was only £1. Nearly 450,000 weevils were destroyed, and there was a satisfactory crop of apples.

This operation must be carried out before the weevils lay eggs, and in order to accomplish this it is necessary to watch closely for their first appearance, and to begin with the earliest varieties of trees.

This system of destroying the apple-blossom weevils might advantageously be practised in Great Britain. It would also be useful in the case of the attacks of other insects, as the Winter Moth caterpillars, for example.

It is, of course, most desirable that the apple-growers in a district should combine and arrange to wage war in this fashion simultaneously, and with the same care and energy.

There are several parasitic Hymenoptera which destroy the larvæ; and some kinds of birds, such as the robin, tomtit, and chaffinch, and some species of linnets, devour both larvæ and weevils. It is believed that the tomtit and chaffinch take the larvæ from the buds.

THE Y MOTH—(*Plusia Gamma*).

(*See Coloured Plate.*)

In some seasons the large prettily-marked caterpillars of this moth appear in great numbers and clear off whole fields

of clover—chiefly the second cuts. They also devour peas, rape, turnips, and cabbage. According to Taschenberg and Ritzema Bos, they attack sugar-beet plants in France and Germany, and Nordlinger says that in France in 1735 they ruined the crops of peas, beans, hemp, flax, and vegetables in wide-spreading districts. In 1828, in parts of East Prussia, many fields of beans, peas, flax, cabbage, and potatoes were stripped of all but the stalks of the plants. Most serious damage has been caused to sugar-beet in more recent seasons in Saxony and other parts of Germany. In the summer of 1879 there was a great invasion of this insect in the whole of Western Europe, and much harm was caused to many crops. In 1881 these caterpillars were abundant in several parts of Kent, and appeared again though in somewhat diminished numbers, in 1892.

Description and Life History.

The Y moth is about three-quarters of an inch long with a wing expanse of from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. The head and thorax are brown, with a purple tinge, and the fore wings are silvery gray, with brownish markings. Upon each wing there is a silvery mark placed obliquely, resembling the Greek letter γ or an English Y. Its hind wings are grayish brown with dark margins.

The caterpillar is usually light green, with pale yellow or whitish lines down its back, and a darker yellow streak along the side, with somewhat sparse hairs upon the body. (Fig. 2 *b*.) It has only twelve feet, and moves with a modified "loop." The caterpillar spins its cocoon under the leaves of plants and changes to a black chrysalis. There are successions of broods. The moths may be seen flying about from June till October, and hibernation is passed in the moth stage and in the chrysalis form, as well as in the larval state, as small caterpillars have been found in the winter.

Methods of Prevention and Remedies.

When the caterpillars are noticed on clover, rolling with a heavy roller has been found beneficial. This can only be done in the early stages of the growth of the plants, after

the first crop has been carried. The caterpillars being green it is difficult to detect them, therefore careful observation is requisite from May to ascertain whether caterpillars are present in the clover crops. If they are present in formidable numbers the clover should be cut as soon as possible to prevent the chrysalids from turning into moths. A correspondent wrote that he believed the attack upon one large clover field was stopped by this means, the chrysalids being taken up with the hay and killed by the heat of the rick.

Lime, and lime and soot mixed, applied in damp weather have been found to be most unpleasant to the caterpillars. Where they are present on turnips and other plants in drills they may be dislodged by bunches of furze, birch, or green broom fastened on each side of a horse hoe. This should be immediately followed by another horse hoe to bury them, or kill them.

These caterpillars are very fond of thistles and nettles. Several correspondents remarked that they appeared to like the thistles in clover fields just as well as the clover. These weeds should be kept down, as they serve as food for the caterpillars before the clovers and other cultivated plants are ready.

In Germany they push long troughs of lath and sacking upon two light wheels through the young clover, flax, and beet, before the plants are too high, to catch the caterpillars.

Many correspondents have written of the inestimable value of rooks, starlings, and other birds in clearing off these caterpillars. Rooks and starlings seem to be particularly fond of them.

AGRICULTURAL AND MISCELLANEOUS NOTES

Consumption of Wheat in Japan and China.

The increasing exportation of wheat from the United States to Eastern Asia has induced the Department of Agriculture at Washington to make some inquiries into the subject of wheat production and consumption in the East, especially as it is considered that the changes now taking place in the civilisation of Japan and China may result in the opening of markets for American wheat, and thus to some extent compensate for possible losses in the European markets owing to the rapid development during the last few years of new wheat-producing areas in other parts of the world.

Most of the wheat sent from the United States to China and Japan is shipped in the form of flour, of which 6,000,000 barrels were exported during the ten years ending 30th June, 1896. During that period the annual exportation to these countries has more than doubled, the consignments having risen from 409,000 barrels in 1887 to 943,000 barrels in 1896. The quantity of wheat grain exported to China has hitherto been too small to be separately distinguished in the trade returns. The quantity sent to Japan averaged 2,692 bushels in the five years 1891-2 to 1895-6; the largest shipment in any single year having been 13,000 bushels in 1894-5. In the latter half of the year 1896, however, nearly 55,000 bushels were sent to Japanese ports, and it is estimated that the total shipments to the same destination for the twelve months ending with the 30th June last exceeded 100,000 bushels.

The Chief of the Foreign Markets section of the United States Department of Agriculture states that an inquiry into the causes of these increased exportations of wheat to the Orient discloses some significant facts which point to the

probability of still larger demands in the future. From a statistical point of view the situation in China cannot be so readily dealt with as that in Japan, owing to the lack of reliable data, but the conditions that exist in Japan may, it is thought, be fairly taken as an index to what may be expected in China. As regards the former country, the official statistics apparently indicate that the production of wheat has not increased commensurately with the growth in population. The average annual population of the kingdom of Japan for the five-year period 1891-95 was 41,441,426, as compared with 39,541,917 for the preceding quinquennium 1886-1890. This shows a gain of 4·80 per cent. in the annual average of the second quinquennium over that of the first. A comparison of the average annual area sown to wheat for the same periods shows that in 1886-1890 it amounted to 1,025,652 acres, and in 1891-1895 to 1,072,174 acres, an increase in the latter period of 4·54 per cent. It appears, therefore, that the extension of the area sown to wheat in Japan during the ten years 1886 to 1895, inclusive, was not commensurate with the growth of the population; and although it is true that the increase in wheat production, as indicated by the annual averages for the two periods, has been somewhat greater, this is said to be accounted for in large measure by the partial failure of the crop of 1890, the abnormally low production of that year causing a material reduction in the average for the entire period 1886-1890. The change in area, however, is held to afford a more reliable test than the returns as to production; and this change has been so slight as to indicate that the growing population of Japan will become more and more dependent upon the wheatfields of other countries for its supply.

The above conclusion regarding Japan's growing dependence upon foreign countries for her wheat supply would, it is maintained, be a safe one, even were the *per capita* consumption of this grain by the Japanese to be no larger than it is to-day; but there is alleged to be abundant statistical evidence to show that the amount of wheat consumed per inhabitant in Japan is steadily increasing. From an examination of the census and production and trade statistics

of the country, it is estimated that the average amount of wheat annually consumed per inhabitant in Japan advanced from 0·39 bushel, or 23·2 lbs., in 1886-1890 to 0·45 bushel, or 26·8 lbs., in 1890-1895. Measured by the standards of the principal wheat-consuming nations, this is an extremely low average of consumption. In the United States the *per capita* consumption of wheat for food alone is estimated to be about $4\frac{2}{3}$ bushels per annum, and it is argued, therefore, that the potential increase in the amount of wheat consumed by the Japanese people is very great. Placing the present population of Japan at 43,000,000, a rate of consumption per inhabitant equal to that in the United States would make the total wheat consumption of the kingdom reach above 200,000,000 bushels. With no increase in the present production of the country this would necessitate an annual importation of about 180,000,000 bushels.

Although the Japanese may never become so thoroughly a wheat-consuming nation as are the people of the United States, there is evidence that this great bread grain is steadily growing in their favour. At a time when other important changes in the direction of a more modern standard of civilisation are so rapidly taking place in Japanese customs it is regarded as only natural that the food habits of the people should be similarly affected, and the indications of such a change are said to be unmistakable.

Unfortunately there are no statistics available as to the amount of wheat consumed by the Chinese people. In some parts of the empire, and particularly in the northern districts, where wheat is raised quite extensively, it is known to be an important article of food. The amount produced, however, is not sufficient to meet the requirements of the population. This is shown very clearly by the extent of the importations. In the steady growth of these importations there is an indication that the consumption of wheat in China is increasing.

Now that Russia, Argentina, and other great wheat-producing countries are competing so strongly for the European market, the oriental countries of China and Japan are held to be well worth the attention of the American wheat grower.

CATTLE REARING IN MEXICO.

Among the industries of Mexico, the rearing and feeding of cattle, which at present is only in a rudimentary condition, is said to be capable of considerable development. According to the *Journal Officiel* lands suitable to cattle rearing are plentiful, but the great obstacle is the water supply. Notwithstanding the torrents of rain which usually fall between May and September, thousands of cattle die of thirst every year, and at least one harvest in two is wholly or partially lost owing to drought. It is believed, however, that these difficulties could be overcome by the construction at a small expense of reservoirs both for watering the cattle and for purposes of irrigation.

The native cattle are worth on the average from 15 to 25 pesos when three years old. Eight to eleven months are necessary to fatten them for the butcher, and they are then worth from 30 to 36 pesos, and weigh from 700 to 800 lbs. There is a considerable trade with the United States in store stock, which are fatted in that country for the St. Louis and Chicago markets.

It appears that there has been some movement among Mexican breeders in favour of opening up an export trade in cattle with Europe, either alive or in the form of refrigerated beef, but inquiry has shown that in the present state of the industry such a speculation could not succeed. The cattle are too small for exportation alive to be remunerative, and the quality of the meat is too inferior to be saleable in any European market.

As regards the capabilities of the Mexican dairy cattle, the native cow yields 10 pints of milk a day as a maximum, whilst an imported Dutch cow will give from 10 pints to 6½ gallons daily. The price, however, of an imported cow is 300 to 350 pesos, against 25 to 30 pesos for a native animal. The production of milk is very profitable to proprietors whose farms are near to towns. Nearly all the large coffee and sugar planters are also cattle breeders. There are generally large numbers of banana trees in the coffee plantations, the green fruit of which when cut-up makes excellent fodder for cows. The leaves of the sugar-cane also are used for feeding bullocks.

AGRICULTURAL HIRINGS.

In a report to the Board of Trade, the agricultural correspondent to the Labour Department states that the rates of wages obtained at the Whitsuntide half-yearly hirings in Cumberland, Lancashire, and Westmorland, were on the whole in an upward direction. Generally speaking, rates of wages for the half-year for the best men, for big youths, and for all female labour increased by 15s. to 20s. per head compared with the corresponding period in 1896, while the wages of second-class men and boys were quite as high as these obtained last year, notwithstanding that the present summer term is fourteen days shorter than the corresponding one in 1896. Ulverston is now the principal market, and the wages obtained there rule the rates for a considerable portion of North Lancashire, West Cumberland, and South Westmorland.

The rates of wages obtained at Ulverston for the half-year (board and lodging in addition) were for best men £15 to £17. A few got £18, and a few farm-managing men qualified to take charge in absence of the master got £20. The rates for second-class men were for the half-year £12 to £14; for youths, £8 to £10 10s.; for boys, £4 10s. to £7 10s.; for best women, £11 to £12; for second-class women, £8 to £10; for girls, £4 to £7. Taking the hiring fairs of Carlisle, Penrith, Kendal, and Lancaster, the rates of wages generally obtained for the half-year (board and lodging in addition) were as follows:—Best men, £13 to £16, and £17 in some cases; second-class men and youths, £8 to £13; boys, £4 10s. or £5 to £7 or £8. Best women, £10 to £12 10s.; second-class women, £8 to £10; girls, £4 to £7.

Reports had also been received of the rates of wages obtained by farm servants at the principal hiring fairs which took place between the months of February and June in the counties of Aberdeen, Banff, Berwick, Dumfries, Edinburgh, Forfar, Haddington, Inverness, Kirkcudbright, Lanark, Linlithgow, Nairn, Moray, Perth, Peebles, Roxburgh, Stirling, Selkirk, and Wigtown. Speaking generally, the information from all these counties was to the effect that wages in 1897 were the same as in 1896. Occasionally, when servants

were leaving their places they had to submit at the hirings to small reductions, but in other cases capable servants remaining on in their places sometimes got slight advances. In a few districts it was reported that men servants were rather more easily procured this year than has been the case for a few years, and this was attributed to the fact that in such districts the farmers are employing fewer men. Women workers are said to be scarce in most parts of the country.

At the annual spring hiring fairs in the Border Counties—namely, Berwick, Roxburgh, and Peebles—there is said to have been a moderate attendance of all classes of farm servants. Men were rather more easily hired than in the last year or two, owing, it is said, to the farmers employing fewer hands. Ploughmen got, as a rule, from 15s. to 17s., and in some cases 18s. a week, with free house and usual perquisites, and women workers 8s. to 10s. a week, with 20s. to 30s. extra at harvest.

In the Lothians, at the yearly fairs in Haddington, Edinburgh, and Linlithgow the rates obtained were very similar to those in the Border Counties—namely, 15s. to 18s. a week for ploughmen, with cottages and the usual perquisites. Women workers 8s. to 10s. a week, and from 3s. to 5s. per week extra during potato-lifting and grain harvest.

At the half-yearly fairs in the counties of Aberdeen, Banff, Dumfries, Forfar, Inverness, Kirkcudbright, Lanark, Moray, Nairn, Perth, Stirling, and Wigtown there were generally no changes in wages compared with 1896. As a rule, first horsemen got from £14 to £17 for the half-year, in some cases up to £18 or £19, with the usual perquisites; other horsemen got from £10 to £14 with the usual perquisites. Cattlemen got from £10 to £19 for the half-year, with perquisites. Youths under fifteen years were paid from £3 to £10, usually with board and lodging. Women workers generally got from 1s. 3d. to 1s. 6d. a day, with 20s. to 30s. extra in harvest. Byre-women in the South-West of Scotland got from £7 to £11 per half-year and board and lodging.

VALUE OF LUCERNE AS A FODDER CROP.

A bulletin recently issued by the Colorado Experiment Station gives the result of some investigations into the growth, composition, structure, and fertilising value of alfalfa or lucerne. From the experiments carried out at the station and elsewhere, the author of the bulletin believes that lucerne will meet the requirements of a large variety of soils and climates, and he regards it as an excellent forage crop of great adaptability. The most trying and fatal conditions to the growth of this plant are a cold, wet winter and poorly-drained or water-logged soils. It has long been observed that stagnant water has a very injurious effect upon it, by destroying its roots, and the effect of stagnant water where alkali is present is said to be especially marked.

As showing the difference in composition between the stems and the leaves of lucerne, reference may be made to some analyses of the leaves at different stages of growth, from the time the plant begins blooming until after blooming. The air-dry stems contained about 6·35 per cent. of protein and about 28 per cent. of carbo-hydrates, while the air-dry leaves, up to the time the plant ceased blooming, contained from 22 to 25½ per cent. of protein and from 40 to 45 per cent. of nitrogen free extract. The leaves are also much richer in fat than the stems; the stems contained four or five times as much crude fibre as the leaves. The richness of the leaves has an important bearing on losses in making alfalfa into hay, as the leaves, being brittle, are readily broken off in handling, and are, to some extent, left on the field. In fact, the author of the bulletin believes it safe to assume that one ton of leaves, broken stems, etc., is lost in the making of every five tons of hay, and that there is thus returned to the soil annually the equivalents of 25·79 lbs. of calcium phosphate, 77·73 lbs. of potassium chloride, and 449 lbs. of nitrate of soda. In addition to this, the principal fertilising ingredients in the stubble and roots have a considerable value per acre.

With respect to the question of the relative feeding value of successive cuttings of lucerne, the average percentages of

protein in the experiments at the Colorado station did not differ very greatly, although the protein was somewhat higher in the first cutting. The farmer who prefers the second or even the third crop for certain feeding is reminded that the amount of protein present is not the only measure of good hay. Not only is the yield said to be greater in the first cutting, but the quantity of protein is, it appears, also greater, and the hay cut just at the beginning of bloom is richer in this constituent than that cut later. From the beginning of bloom to half bloom the amount of protein seems to be nearly stationary, and the crop is also probably at its maximum. If the plant continues to store up organic matter after this period is passed, it is believed that the losses by the dropping of leaves due to the maturing of the plant and the action of the fungus common on the alfalfa probably more than equal the gain. The crude fibre of the whole plant gradually increases as the plant matures.

From a comparison of the composition of the hay made from lucerne with that made from clover, it appears that 100 lbs. of lucerne hay contains 54·5 lbs. of digestible food with over 11 lbs. of protein, while 100 lbs. of clover hay contains 47·5 lbs. of digestible food, of which nearly 7 lbs. is protein.

The amount of fertilising materials removed from the soil in a ton of lucerne hay is estimated at 44 lbs. of nitrogen, 8·27 lbs. of phosphoric acid, and 50·95 lbs. of potash; about 40 lbs. of lime are also removed. It is to be remembered that lucerne belongs to that class of plants which are able to derive their nitrogen largely from the atmosphere. Tubercles containing bacteria appear on the roots in three forms—as warty excrescences near the neck, and as single and colonised nodules on the roots. The excrescences only appear at shallow depths, the colonies at from 3ft. to 5ft. and the single nodules at all depths. These nodules were found to differ greatly in abundance on roots of plants in different localities, though the plants appeared of equal vigour and the proteids in the hay varied little. Compared with vetches and red clover, lucerne is poorly supplied with nodules, but the groups are much larger, frequently being

1·5in. in diameter. Some of these groups were analysed and found to contain 5·725 per cent. of nitrogen, while the cortex of the roots contained only 2·25 per cent.

The feeding value of alfalfa for bullocks has been the subject of experiment during two years at the Utah Experiment Station, and the conclusions arrived at have recently been published in a bulletin issued by the station. Comparisons have been made of the value of early, medium, and late cut lucerne, and of the first, second, and third crops. A section of a field of lucerne was cut just before blooming—this was called early-cut; another section, cut about a week after blooming commenced, was called medium-cut; and a third section, cut about one week after full bloom, was designated late-cut.

In some periods the lucerne was fed without grain, and in others bran and wheat were added. The results show that steers fed with lucerne, either with or without grain, made the most rapid gain on the early-cut and the least gain on the late-cut. This was true for the early cutting of both the first and second crops. Pound for pound the early cutting gave the best results; that is, less food was required per pound of gain when early-cut lucerne was used than on either medium- or late-cut. The early cutting also yielded the most hay; medium cutting came second. It is estimated that fully one-third more beef can be produced per acre with early cuttings than with either medium or late cuttings.

For the different crops of lucerne, the rate of gain and the food required per pound of gain both favoured the third crop, the first crop being second in value. There was very little difference in composition between the first and second crops, but the third crop contained more protein and less fibre than the other crops, thus indicating its superior feeding quality. Pound for pound, good lucerne proved to be equal to timothy-hay, while in the rate of gain it proved better, and it was noticeably superior to clover-hay.

Two tests were made in which the object was to compare lucerne or alfalfa with mixed hay, and with alfalfa mixed with straw. The average results are given in the following

table. All the animals received bran and wheat in addition :—

—	Weight at beginning.	Weight at end.	Gain per day.	Cost per month.
	lbs.	lbs.	lbs.	s. d.
Mixed hay - - - - - -	930	1,228	2·27	10 10
Lucerne - - - - - -	921	1,164	1·86	9 7
Lucerne and straw - - -	924	1,233	2·34	9 2

From this it would appear that a ration of lucerne and straw, with grain, proved superior to one of lucerne and grain ; whilst mixed hay and grain proved superior to lucerne and grain, but not quite so good as lucerne, straw, and grain.

THE CAPER INDUSTRY OF ROQUEVAIRE (FRANCE).*

The caper industry of Roquevaire, in the department of the Bouches-du-Rhône, presents an interesting case of co-operation undertaken chiefly with the object of ensuring the maintenance of the reputation of a locality for the quality of its produce. The caper-producers of Roquevaire and of some other neighbouring localities have, it is stated, combined in response to an economic necessity, in order to counteract the continual depression of prices induced by the action of the local trade, which mixed Algerian and Spanish capers of inferior quality with those bought in Provence. The producers of these localities have accordingly determined to take the trade into their own hands, and have formed themselves into a syndicate for that purpose. Roquevaire contains some 3,000 inhabitants, and nine-tenths of the caper-producers of the commune (who alone are eligible to the association) have engaged to deliver their whole production, amounting to some 220,000 lbs. or more, to the syndicate. The experiment is said to have proved completely successful.

The caper is the floral bud of a bush (*Capparis spinosa*) which has been cultivated from time immemorial in Provence.

*From "La Co-opération de Production dans l'Agriculture," by the Comte de Rocquigny.

This bud is picked when very small, as its quality deteriorates as it grows larger. The labour of picking the buds devolves upon the members of the association. It is usually done by women at intervals of five or six days during the season, which lasts from the end of May till the beginning of September. When gathered the capers are put into wine vinegar (provided by the syndicate at cost price) so as to be only just covered, and steeped for two or three months, after which they are delivered to the association, by whom they are sifted and then replaced in vinegar in the society's cellars, being kept in barrels until sold. The producer is credited with the weight of the capers furnished by him, and the quality of the buds as determined by the sifting (at which he can be present if he chooses) is also noted. Some twenty women are usually employed at the association's headquarters for about six months in sifting, which operation is performed by hand with the aid of a metal sieve.

The capers are classified in six qualities, the finest being worth, in 1894, about £4 per cwt., and the inferior sort about 10s. The net produce of the sales, after deducting the general expenses of the syndicate, is divided among the members proportionally to the amount and quality of their deliveries. Thus the money received from the sale of first quality capers is divided solely among those who have delivered capers of that grade, and the members have accordingly an interest in increasing the quality of the produce.

The capers may be kept a year or more in the cellars. On being sent away they undergo a double straining, and as they have absorbed some 10 per cent. of their weight of vinegar, they keep very well without any further addition in a hermetically sealed barrel.

The principal outlets for these capers are Russia, Germany, Sweden, England, and America. Apart from the assistance given by the consuls in those countries, the sydicate has also agents abroad, who are paid by a commission on the sales.

As many cultivators would not be in a position to wait for their returns until the sale of the goods, the syndicate advances money at 4 per cent. to such of its members as require it, to an amount not exceeding three-fourths of the

presumed value of the capers delivered. The daily receipts from the sales have hitherto proved sufficient to meet the demand for such loans; but the association has secured the faculty of obtaining, if necessary, a considerable credit at its bankers for this purpose. This can be drawn upon the signature of the president, and all the members are liable for its repayment.

In 1893 the members of the syndicate picked 1,659 cwt. of capers, and their sale produced £3,115. This allowed of an average of 4d. per lb. being handed over to the members in 1894, or about the same as was paid by the trade, which appears to have maintained that price solely in order to retain clients among the caper-producers, and to be able to compete with the syndicate. Before the latter was established the trade only paid $2\frac{3}{4}$d. and 3d. per lb. In the season 1894-5, however, the syndicate could only distribute $3\frac{1}{2}$d. per lb., owing, it is said, to the outside trade delivering mixed capers under the name of Roquevaire capers, and thus lowering the prices in the consuming markets.

Co-operative associations for the sale of capers have also been formed in other neighbouring localities. The syndicate of Cuges undertakes the preliminary maceration of the buds, which at Roquevaire is performed by the individuals; the sifting is also done by machinery, although the results are not considered quite so satisfactory as when this operation is done by hand, but it constitutes a saving in the cost. Further, in distributing the money received from sales among its members, the Cuges association takes account only of the quantity of capers delivered, without reference to quality.

GERMAN MARGARINE LAW.

The Board of Agriculture have received through the Foreign Office a copy of the German Law of 15th June, 1897, concerning the trade in butter, cheese, lard, and their substitutes. The principal provisions of this law are as follows:—

Premises wherein are sold margarine, margarine-cheese, or

artificial fats (which are defined to mean any preparation resembling pure butter, cheese, or lard, respectively) must be provided with notices that such goods are on sale, conspicuously displayed. Vessels and wrappers containing these goods must also bear a similar clearly visible designation, and must further be provided with a red band. The details as to the size, position, etc., of the inscriptions and red streak have been laid down with great minuteness by the Federal Council. All wrappers in which such goods are delivered to purchasers in the retail trade must also bear the proper superscription, and if the substance is exposed for sale in regularly shaped blocks, these must be in the form of a cube. At public auctions, and in all trade notices, invoices, way-bills, etc., the designations required by the law must be employed.

The mixture of butter or "butter-lard" with margarine or other fats prepared for food, with a view to trade, is prohibited; and the employment of more than 100 parts by weight of milk or cream for every 100 parts of other fats used in the manufacture of margarine, is also forbidden.

The manufacture, storage, package, and sale of margarine or artificial fats is prohibited upon premises where butter is manufactured, stored, packed or sold, and a similar clause prescribes separate premises for genuine cheese and margarine-cheese. This provision does not apply to the retail trade in localities with less than 5,000 inhabitants (unless the proximity of a town with a population of over 5,000 appears to the local authorities to render it desirable), but margarine, margarine-cheese, and artificial fats must nevertheless be kept in separate vessels, and in a different place from the genuine butter, cheese, or lard.

Margarine and margarine-cheese intended for commercial purposes must contain an addition facilitating the general recognition of the commodity by chemical analysis, but not injuring the constitution or colour. By a subsequent resolution of the Federal Council (July 2nd, 1897) it has been decided that this substance shall be sesame-oil, of which not less than ten parts (by weight) must be added to every 100 parts of fats and oils used in the preparation of margarine, and not less than five parts in the case of margarine-cheese.

The manufacture of margarine, margarine-cheese, and artificial fats is subjected to official supervision, and due notice of intention to engage in the business must be given, with all particulars, to the proper authorities. Factories already working must also report the same details. Police inspectors may enter the premises where such goods are manufactured, stored, or sold at any time during business hours to take samples; any information required by them as to the processes employed must be given. The police inspectors are bound upon oath not to divulge any trade secrets thus learned.

The Federal Council is empowered to prohibit the sale of butter of which the fat constituents do not attain a certain standard, or of which the water or salt contents exceed a certain limit.

The law is not applicable to such artificial fats, etc., as are not intended for human consumption, nor to unadulterated fats from certain kinds of animals and plants, if sold under designations corresponding to their origin.

Infractions of the law are punishable by imprisonment up to six months, or to a fine not exceeding £75, or to both of these penalties. In addition, the commodities found adulterated or improperly manufactured may be confiscated. A police inspector divulging any trade secrets or using them to his own advantage is also liable to fine or imprisonment to the same amount. A prosecution against a police inspector can only be undertaken at the instigation of the person carrying on the business. Persons refusing to allow the police officials to inspect their premises, making false declarations, or committing other minor infractions of the law, are also liable to fines or imprisonment. This law comes into operation on October 1st, 1897, except as regards the provisions relating to the separate sale premises for butter and margarine, etc., which do not come into force until April 1st, 1898.

INTRODUCTION OF THE CARROT INTO ENGLAND.

A memorandum by Sir George Birdwood on the purchase in Europe of carrot seed for the purpose of famine relief

in Northern India contains some information respecting the introduction of the carrot into England. It seems that this vegetable was not introduced into this country before 1510. It came from Flanders, and was first extensively cultivated during the reign of Queen Elizabeth by some Flemings at Sandwich, where the soil is exceedingly favourable to the growth of the long tap root of the plant. It became generally known during the reign of James I., and was held in high esteem; Parkinson, the author of *Theatrum Botanicum*, 1640, and *Paradisus Terrestris*, 1656, mentions the fashion of the ladies of his day using its elegant fern-like fronds as feathers for their head-dresses. On the outbreak of the "Great Rebellion," agriculture in England relapsed, for about fifty years [1642-1713], into almost the same primitive condition in which it had lain all through the "Wars of the Roses" [1455-1485]; but it again began to revive after the defeat of Monmouth and the establishment of peace in Central and Western Europe by the Treaty of Utrecht; and subsequently to the establishment of the Hanoverian dynasty, the cultivation of the carrot was rapidly extended throughout the country, developing in Surrey in the "Long Red" or "Long Surrey," and in Cheshire the "Altringham," another red variety, which is known as the "orange cattle carrot." These denominations still maintain their ground. The other principal varieties of carrots cultivated in the United Kingdom are of foreign development, as the "Short Red" or "Early Horn" of Holland, the "Large White" and "Yellow" of Belgium, and the "White Horn," or *Carotte des Vosges*.

In this country the cultivation of the carrot was wonderfully stimulated by the practice of the Society of Arts in the past century, and in the earlier years of the present century, of awarding small prizes for all kinds of agricultural experiments and improvements. They began giving prizes for carrots apparently very early in the eighteenth century. In 1764 they awarded a prize of £20 to Mr. Robert Billing, of Wesenham All Saints, Norfolk, for growing at one time thirty acres and two roods of carrots; and again, in 1765, £20 for growing 24½ acres of carrots. Mr. Billing reported

most favourably on the roots as fodder for neat cattle, sheep, horses, and hogs; and his report was published by the Society in 1765, and re-published in the fifth volume of the *Museum Rusticum.* After 1765 the prizes for carrots were formally discontinued, "on account of the end sought by the Society having been entirely answered, and their utility demonstrated to the public." Nevertheless, the Society gave a silver medal to Mr. Wallis Mason, of Goodrest Lodge, near Warwick, in 1805, for his experiments in the cultivation of carrots; and again, in 1806, to Mr. John Christian Curwen, of Workington, for cultivating carrots and using them as fodder for cattle.

ANGLO-GERMAN GRAIN TRADE.

In a report to the Foreign Office on the trade of Germany during the year 1896, Consul-General Schwabach states that since the rescinding of the "Identitäts Nachweisen," or certificate of origin regulation, certain Baltic ports, viz., Dantzic and Königsberg, export wheat and oats to England. Stettin sends barley from the Oderbruch, and Hamburg barley from Silesia, and, particularly, from the valley of the Saale. Statistics also show an export of corn from England to Germany, but this refers only to seed corn of different varieties of wheat and oats, and not to corn intended for consumption. It is true that much corn sent from the Black Sea, the Sea of Azov, America, Australia, Brazil, etc., probably through English factors, first lands on the English coast, and is thence shipped to Germany.

It seems that great quantities of maize were last year imported into North Germany, where it is extensively used for fodder, but it came from the Danube, or from America. Business firms had a somewhat unfortunate experience in this article, particularly in that imported from America (mixed). In spite of American certificates, the supplies, particularly the spring loadings, arrived in a warm, mildewed, and consequently spoilt condition.

The export of flour to England, so far as concerns Berlin, consisted principally of coarse meal used for fodder. The

export of this article has decreased, probably owing to the enormous American harvest in maize, which made it more profitable for England to procure this article from America.

Consul-General Schwabach draws attention to a decision lately arrived at by the Union of German Millers, which is worthy of the notice of English merchants. This decision is declared to have been arrived at in the interest of the millers, of commerce, and of agriculture generally, and is to the effect that the German importer is no longer bound, in his business transactions concerning the delivery of corn, by the English contracts, but by a German contract, based upon German business principles, in which it is provided that, if the dust or other impurities contained in the corn exceed a certain fixed percentage, damages are due to the receiver of the corn to the value of double the amount of such percentage; and further that all disputes arising from these contracts are to be submitted for settlement to a court of arbitration.

[*Foreign Office Report, Annual Series, No.* 1977. *Price* 1½*d.*]

AGRICULTURE IN DENMARK.

In a Report upon the trade and agriculture of Denmark in 1896, Captain Boyle, Her Majesty's Consul at Copenhagen, states that it was thought by Danish farmers that the year 1895 would be the turning point in the agricultural state of that country, but that 1896 was a disappointing year to them in more ways than one. It seems that their past experience causes farmers to take a gloomy view of the future, and that some of them wish to sell their farms, and others to give up renting. That sales have not taken place to a greater extent is attributed to the fact that prospective buyers are holding back till they see matters improve and are able to invest capital bringing a sure return. It is also said to be most difficult for those who own land to let their farms, as rents decreased 20 to 30 per cent. during 1896. The Government is doing all in its power to help agriculture, not only by giving information of every description to farmers, but by

starting experimental farms, schools, etc. The appointment of an Agricultural Minister has given the greatest satisfaction, and has been most cordially approved.

The gross value of the harvest in 1896 for the whole country is calculated to have been about £16,474,000, of which £8,542,000 is for the islands, and £7,932,000 for Jutland. The harvest in 1896, when compared with that of 1895, shows an increase in value of £722,000, but is £83,000 less than the average for the last five years. The amount of the harvest was somewhat larger in 1896 than in 1895, but the considerable increase in value is chiefly due to the prices having been higher than in 1895. When compared with the last five previous years, the amount in 1896 was on the whole larger for all crops, but the prices were lower than the average prices for the same period.

The following table shows the estimated value of the different crops in 1896 :—

Crops.		Quantity.	Value.	Percentage.
			£	
Wheat	Bushels	4,938,843	855,769	5·19
Rye	,,	18,599,898	2,344,756	14·23
Barley	,,	22,012,206	2,891,709	17·55
Oats	,,	36,065,028	3,558,357	21·60
Buckwheat	,,	749,056	95,573	0·58
Beans and peas, &c.	,,	772,969	126,316	0·77
Mixed seeds	,,	8,085,324	884,468	5·37
Potatoes	,,	20,602,494	996,849	6·05
Fodder	,,	80,751,219	1,185,597	7·20
Beetroots	Cwts.	4,067,925	171,208	1·04
Colza	Bushels	27,876	6,513	0·04
Clover	Lasts of 1,100 lbs.	1,259,903	1,937,471	11·76
Hay	Lasts of 1,100 lbs.	1,204,816	1,419,535	8·62
Total			16,474,121	100·00

The breeding of pigs, taken as a whole, was not quite so profitable as in 1895, as prices were so bad during the first four months of 1896. Still, the production has increased. During 1895, 191,000 pigs and 109,000,000 lbs. of pork and bacon, and during 1896, 3,580 pigs and 154,000,000 lbs. of pork and bacon were exported. The increase is thus about 22,000,000lbs., taking each pig on the average to be 120lbs., so that it may be fairly taken that breeding pigs was a profitable business in 1896.

During 1896 the import of sheep was larger than the export, which is unusual. The number imported was 9,269, and 7,050, roughly speaking, were exported. The Danish Government experts are continually pointing out that the breeding of sheep is very profitable to farmers, if only good breeds are used, and this advice has been attended to by some, as they have imported some fine-bred Oxford Downs, which are considered to be admirably adapted to the Danish climate.

Horses were exported to the number of 17,729, or about 300 more than in 1895, and the import increased by 1,200. Most of the animals exported were sent, as usual, to Germany, while the imports were chiefly from Germany and Sweden. Danish breeders are endeavouring to breed only from the very best strains, either for heavy draught or light traffic purposes.

Barley disease was not so bad as in 1895, perhaps owing to the drought during 1896, but in some districts it was reported to have ruined nearly half the crop. Many experiments have been made to find out, if possible, what are the best sorts of rye and barley most suited to Danish soil, and as regards the former, it has been decided that the Bretagna rye is not only the best but the most prolific, besides giving an excellent quality of straw for feed, etc. The Hessian fly made its appearance during 1896, which is the first instance of its having been found in Denmark.

[*Foreign Office Report, Annual Series, No.* 1920. *Price* 3*d.*]

HORSE BREEDING IN INDIA.*

In 1891 the Civil Veterinary Department took over the management of horse-breeding operations, which were formerly under the direction of military officers. The staff of veterinary surgeons concerned with this business is distributed over the several provinces where horses and mules are bred. These officers not only supervise horse-breeding and mule-breeding, but, in conjunction with the

* From the *Statement exhibiting the Moral and Material Progress and Condition of India during the year 1895-96.*—H. C. 328. Price, 1s. 11½d.

district authorities and local boards, they organise and control operations for combating cattle disease, and help to instruct Indian students at veterinary colleges. The returns of agricultural stock are not complete for all provinces, and are altogether wanting for Bengal; but the total number of horses and ponies in British India, outside Bengal, is returned at 1,133,000, while the number of mules and donkeys is given at 1,101,000. The North-West Provinces and Oudh return 493,000 horses and ponies, and 309,000 mules and donkeys, while the Punjab returns 557,000 mules and donkeys, and 271,000 horses; the Bombay returns show 152,000 horses, and 67,000 mules and donkeys. The totals are somewhat above those for the previous year, except in the North-Western Provinces, where the numbers of mules and donkeys fell off. The number of stallions kept by Government for horse-breeding, at the end of the year 1895-96, was 361, or 11 less than in the previous year; 51 new stallions were bought, and 62 were struck off the register, mostly because they were old and worn out. The new stallions were chiefly English or Australian thoroughbreds and Arabs. At the end of the year there were 110 Arabs, 99 Norfolk trotters, and 18 thoroughbreds. There were, in March, 1896, also 385 pony stallions for Galloway and pony mares; and the number of donkey sires bought during the year was 49, while 46 died or were sold. The number kept by Government for mule-breeding was 385 at the end of the year. Of the total, 192 were Italian donkeys, but these animals are very expensive, and a gradually increasing number of large donkey sires is being obtained from donkey breeders in the Punjab and Baluchistan. The donkey sires imported during the year were from Italy and Persia, and of good stamp. Besides the Government stallions, 171 horse and donkey stallions were maintained by district boards, and a considerable number by native states. The officers of the Veterinary Department give every assistance to chiefs and to local bodies in obtaining good sires.

At the end of the year, 23,250 branded mares were on the list as available for horse-breeding, and 5,619 for pony-breeding, from sires kept by Government. Of this number,

14,305 mares were covered by Government stallions during the year, and 4,188 foals were reported to have resulted from the coverings of the previous year, apart from 2,011 cases in which the results were unknown; 7,236 coverings are known to have yielded no foals. The average number of foals thrown to each horse stallion employed in the previous year ranged from 6·4 in Sind to 22 in Baluchistan, and 15·8 in the Northern Punjab; and for all India the average was 13·6 for horses, and 12·0 for ponies. It is said, however, that the statistics are not trustworthy, and are probably below the truth. By the Government donkey stallions 18,475 pony mares, besides 966 donkey mares, were covered; and 3,734 mule foals, besides 214 donkey foals, are reported to have been born. The veterinary officers believe that the produce of the mares served by Government sires is greater than these figures would show. The stallions kept by district boards and local bodies covered 7,682 mares during the year; 1,872 foals are reported to have been born during the year; in 1,174 cases the results were unknown; but the returns of the produce of these mares are open to doubt. The average yearly cost of keeping stallions ranged from Rs.153 to Rs.401 for horses, and from Rs.122 to Rs.419 for donkey stallions in several provinces. Baluchistan, the Deccan, and Sind are the provinces where the cost of keeping stallions is highest. The number of remounts purchased for the army at the different horse fairs was 2,365, while 1,746 mules were bought for army purposes.

AGRICULTURE IN PARAGUAY.

In his last Report on the Trade of Paraguay Mr. W. J. Holmes, Her Majesty's Consul at Asuncion, states that the agricultural development of Paraguay may be said to be still in its infancy, and making but slow progress, notwithstanding the efforts of the authorities to encourage and assist agricultural industries by every means in their power. The total area under cultivation, as compared with the vast tracts of forest and grass land with which the country is covered, is infinitesimal. Rarely, except where foreign colonies have

been established, does one see land cultivated on anything but a very small scale. This state of things in a country so extremely fertile may be a matter for surprise; but the cause or causes are apparently not far to seek. It is ascribed to the paucity and extreme poverty of the scattered population, to the lack of means of rapid communication, and to the fact that landowners find it more profitable to devote their attention to cattle-breeding than to the cultivation of the soil. The agriculturist has, besides, two formidable enemies in the shape of weeds and insects to contend against. The latter, it is true, may only occasionally invade his land and cause him serious damage; but with the former he has to struggle continuously.

One great impediment in the way of the colonist is his inability to find a sale for his produce. Buried in the forest, perhaps many leagues from town, village, or highway, how is he to derive any profit from his labour? If he has pitched on land near a town or village, and has sufficient capital to carry him through the first year or two, he may succeed afterwards in supporting himself and family at the expense of little labour; but he will not make money. If he has no capital, and settles in one of the established colonies, the administrator of that colony will, it appears, provide him with the means of subsistence during the first six months, and assist him in other ways; but, except in a few instances, this method has not been productive of good results. Once accustomed to live on external contributions, the chances are very great that he will turn out a failure as a colonist when thrown upon his own resources. The demoralising effect of this often misapplied generosity is said to have been frequently demonstrated in the "Colonia Nacional," a Government settlement situated at the extreme end of the railway, where many, finding that the pecuniary assistance they received was ample for their daily wants, bestowed very little trouble on their holdings, and as soon as the grant ceased, quitted the colony and the country, most unjustly laying all the blame for their failure on the authorities. It is remarked, however, that some of the more upright and hard-working settlers in this colony can show well cultivated

holdings; but that the complaint is general that they cannot sell their produce, or, if they succeed in disposing of it, that the price paid is so low as hardly to requite them for the time and labour expended. The principal crops raised are maize, manioc, sugar-cane, tobacco, alfalfa (lucerne), and beans. Maize and manioc form the staple food of the peasant class and poorer townspeople. It is found very difficult to keep the former any length of time, as no sooner is it stored than it is attacked by the weevil. The price of maize varies between 50 c. (4d.) and 2 dol. (1s. 4d.) per arroba (25 lbs.). Manioc, called mandioc in Spanish, is still the substitute for bread with a great number of the peasant population. In the towns flour-mills and bakeries have been set up, and bread has largely taken the place of manioc.

Wheat is imported from Argentina. Many attempts have been made to grow this cereal in Paraguay, but hitherto without success.

Cattle breeding is a better paying business than most others at present carried on in Paraguay. It is, at least, said to be one of the safest. The yearly increase on the entire herd on an estancia may be reckoned at from 25 to 35 per cent.; but the latter figure would probably only be reached on estancias where the animals receive proper care, and where the pasture is above the average.

[*Foreign Office Report, Annual Series, No.* 1963. *Price* 1½*d.*]

Ensilage of Potatoes.

In continuation of the experiments referred to in the last number of the Journal (p. 37) to determine how far potatoes kept in silos can be used as food for stock without being subsequently cooked, M. Cormouls-Houlès has communicated to the *Société Nationale d'Agriculture de France* some further results he has obtained in this connection. Two lots of heifers received the same rations, except that potatoes which had been kept in silos were substituted in the food of the one lot for the cooked potatoes received by the other. The weight of dry matter in the rations was as follows:—Hay (dry

matter), 15 lbs.; potatoes (cooked or from the silo), $3\frac{1}{4}$ lbs.; cake, $5\frac{1}{2}$ lbs.; or $23\frac{3}{4}$ lbs. in all. The increase in weight shown by both lots was the same. M. Girard pointed out, however, that the potatoes only formed a small percentage of the rations, and that the experiment could, therefore, not be held to prove conclusively that the preserved potatoes were as good for stock as the cooked.

Keeping of Cider.

Much of the cider in farmhouses is stored in casks *kept upright.* As the result of observations and experiments by Mr. J. F. Lloyd, F.C.S., F.I.C., it has been found that cider so stored does not keep so well as when the barrels are laid down. It is more liable to become acid in an upright barrel. Now cider does not become acid *unless air gets to it.* In fact, the longer the cider is kept free from the air, the less acid it becomes. This fact is important and may not be generally known. It is most noticeable in bottled cider. For example, some cider containing 0·65 per cent. of acid was bottled for experimental purposes, and some months afterwards was again analysed. It then contained only 0·48 per cent. of acid (malic). In another instance the juice contained when bottled on the 24th January, 1896, 0·62 per cent. of acid; on the 7th May, 1896, 0·53 per cent. of acid; on 2nd November, 1896, 0·45 per cent. of acid. The reason why air gets to it more readily when the barrel is upright is not difficult to find. Whenever a barrel is thoroughly cleaned the head is the part taken out. It may be replaced with skill, but is never so tight as it was originally. So long as it is wet it may be tight, but if allowed to get dry it opens more readily than any other part of the barrel. When the barrel is upright the head does get dry unless special means are taken to keep it moist. Then air reaches the cider, the alcohol undergoes a change, and is converted into acetic acid (vinegar). This is one cause of bad cider. Another is the custom of spiling casks, and now and again drawing a little out for friends to taste. The air gets in after each drop is drawn (unless the cider is highly carbonated, *i.e.*, contains

a quantity of gas), and vinegar fermentation starts. Again, it has been noticed that the spiles sometimes leak a little, the cider trickles down the barrel, and in hot weather a slimy mass will be found where the cider has been. This growth is injurious to the cider, and should never be allowed to exist in a cider cellar. The outsides of the casks should be kept scrupulously free from it, for when next a glass of cider is drawn from such a cask, the chances are that in replacing the spile some of the slimy growth will be introduced into the barrel, to carry on inside its destructive action. The remedy for each of these evils is easy and obvious, it is to keep the barrels flat, and not to spile them until it is necessary to sample for sale.

An Italian Agricultural School.

Mr. E. Neville-Rolfe, in his report to the Foreign Office on the trade of Naples for the year 1896, states that several schools have sprung up of late years in various parts of Italy, the most important institution being that of Portici, about six miles from Naples. The school has been in existence about twenty-four years, having been originally established by the province, but it was taken over by the State, and re-established by Royal Charter in 1885; a portion of the disused Royal Palace was given over to its use, the spacious grounds, gardens, and useful group of farm buildings being especially adapted to the purpose. The instruction is conducted by sixteen professors, each of whom takes his own branch of the subject, and lectures upon it. The course occupies three years, after which students who satisfy the examiners obtain the degree of "Laureato Agronomo," or bachelor of Agriculture. Besides the lectures, practical instruction is given in the field, and the making of cheese, wine and oil is systematically carried on. It is, in short, an agricultural university. 670 scholars have passed through the school, of whom 228 have obtained degrees. Most of the laureates become professors in other colleges in Italy, and some have gone to other places, such as Cairo, Buenos Ayres, and San Francisco. One very

useful branch of the institution is the exhibition of agricultural machinery, upon which the future of Italian husbandry so much depends, and another is the dissemination of pamphlets by the various professors on their special subject. Of these there is one of some interest by Professor Italo Giglioli, the head of the school, on the importation of Italian fruit into Great Britain. He begins by comparing the total importation of fruit into the British Isles in 1880 and 1890. In 1890 only 4 per cent. of the fruit imported into Great Britain came from her own colonies, and 8 per cent. from Italy; but the Professor is strongly of opinion that, while the colonies have increased their exports to a very large extent, the next decennial period will show that Italy has not been idle, and that with more attention to cultivation, packing, and means of transit, Italian fruit will obtain a more influential place in Great Britain, which is shown to be the most important fruit market in the world.

(*Foreign Office Report, Annual Series, No.* 1868. *Price* 1½*d.*)

Austro-Hungarian Live Stock Trade.

In the report to the Foreign Office on the trade of Austria-Hungary during the year 1896, Consul-General von Schoeller says that despite the rapid development of her industrial resources of late years, the dual monarchy still has enormous agricultural interests, although unfortunately there seems just now but slight prospect of a profitable outlet being found for the products of cattle breeding and husbandry. In these circumstances, therefore, all particulars relative to the import and export of live stock are interesting, inasmuch as they serve to demonstrate the measure of material prosperity enjoyed by a large class of the population, and at the same time show the progress made, or decline experienced, in a branch of industry which is justly regarded as of paramount importance for the country. The returns for 1896 show that the value of the live stock exported during that year decreased by £1,365,170 as compared with the preceding twelve months, while numerically there was a

falling off of 194,304 head of cattle of all kinds. Various arguments are put forward to account for this state of affairs, amongst which the scanty harvest and the divers prohibitive measures adopted by countries which formerly drew the bulk of their supplies from Austria-Hungary, are prominent. The acute character assumed by the agrarian agitation in Germany during 1896 is likewise referred to as one of the reasons which have detrimentally affected the final annual returns. The imports of live stock during the year similarly showed a decrease, which is estimated at about £463,000, representing 111,694 head of cattle of all kinds less than in 1895.

[*Foreign Office Report, Annual Series, No.* 1975. *Price 2d.*]

Austro-Hungarian Egg Trade.

According to the report by Consul-General Von Schoeller, egg merchants in Austria complain that trade during 1896 was not so satisfactory as usual. In the year under notice the quantity of eggs imported amounted to 36,617 tons, and that exported to 90,117 tons. As compared with the preceding 12 months, there was a falling-off of 3,121 tons in the imports, and 2,813 tons in the exports. The decline is mainly attributed to Russian competition, which is becoming keener from year to year. For some time past the Russian Government has devoted special attention to the furtherance of the agricultural interests of the country, and as in certain rural districts the egg trade constitutes an important branch of commerce, it has likewise received due consideration. According to a clause in the last customs treaty between Russia and Austria-Hungary, eggs are allowed free entry into the dual monarchy. In addition, exceptional facilities, such as reduced freight tariffs, &c., have been granted by the Austro-Hungarian State Railways for the transport of Russian eggs. As a consequence, the Russian exporter is in a position to compete with the Galician dealer, and owing to superiority in the manner of packing, and various other reasons, the Russian product is gradually gaining the upper hand. Efforts have been made by those interested in the development of the home trade to

secure a mitigation of these unfavourable conditions, but up to the present their attempts have not proved successful. England consumes by far the greater quantity of eggs exported by Austria-Hungary. Of late, however, it has been remarked that the Russian product is largely consumed in England, and now predominates in those markets where Hungarian and Styrian eggs formerly had the monopoly.

A Co-operative Milk Factory in New England.

A recent report by the Dairy Commissioner of the United States Department of Agriculture furnishes a brief description of a co-operative milk factory in New England, which was started about fifteen years ago. The Hampton Co-operative Creamery Association was one of the very first organised in New England in the year 1881. It was established on a purely co-operative basis, and stock was subscribed to the amount of £400. This was divided into 100 shares of £4 each, and distributed as widely as possible among the cow owners who agreed to supply the creamery with milk. Half the capital was spent in purchasing an old but substantial dwelling-house of two stories, with a large storage attic and an excellent cellar, with two acres of land. It was believed that this property could be fitted cheaply to answer the early needs of the work, and that the alterations, fittings, and equipment would not cost over £200. This was actually exceeded by £80, so that the enterprise started with a debt of that amount. The sum of £30 was then set aside annually as a fund for the improvement of the property, payment of interest, and reduction of debt. An ice house was also built, and cold storage arranged in it, as well as a cold room in the house basement. During fifteen years about £400 have been expended in improvements and new plant. The cream, upon arrival, is unloaded under a covered shed at the west corner of the building, carried into the receiving room at that corner of the main floor, and thence conducted to the vats directly below. These are upon a raised platform, so that when the cream is ready it can be run directly into the churn. The ice house is in the yard, a short

distance from the main building. The arrangements, as a whole, are not quite as complete and convenient as if twice as large a capital had been raised and a building specially constructed, but the business has been fairly well provided for, and the necessary changes and improvements have been easily made as required. Whereas this factory made at the start less than 200 lbs. of butter a day, its operations have grown so that 700 to 800 lbs. are now turned out daily. The share capital is now £500, upon which a 6 per cent. dividend is annually paid, and the property is valued at £800.

Danish Condensed Milk.

It has for a long time been the aim of scientific effort to produce condensed milk which in taste, smell, nutritive value, and easy digestibility, would replace fresh milk, and the difficulties which have hitherto prevented the achievement of this result are now stated to have been surmounted by a process discovered by a Danish expert connected with the treatment of milk. By a very simple and ingenious method, the milk is condensed at a low temperature in such a manner that its chemical composition is not altered, and at the same time all bacteria are destroyed. The cows yielding the milk used in the factory are subjected to constant inspection of veterinary surgeons to guard against the transfer of any contagious diseases, of which milk may often be the bearer. Condensed to about one-third of the original volume, it may in this state serve the purpose of ordinary cream, and, mixed with two parts of water to one of condensed milk, replace the original pure milk. The principal object is, however, to provide an article of export (packed in hermetically closed tins, to secure durability for an indefinite length of time) and for use in tropical climates, where there is no opportunity of obtaining fresh milk. The milk, after passing through the condensing vats, is tapped by the method patented by the factory into sterilised tins, which are closed air-tight as they run full, one by one, and then soldered down immediately. These tins are then placed in rows on shelves, where they remain for some time under close observation until

they are packed for exportation in cases containing four dozen each. The tins are fitted with tubes, the cutting of which enables the milk to be drawn in a clean and convenient manner. After a portion of the milk has been taken out, the tubes prevent the exposure of the milk to the air, and by this means the product retains its freshness and purity for a long period.

[*Foreign Office Report, Annual Series, No.* 1920. *Price* 3*d.*]

An Italian Rural Co-operative Society.

In the small town of Feltre, which is situated in the Venetian Alps, there exists a Co-operative Society composed of members who belong to all classes of the agricultural community. The holdings in the district are generally small; frequently so small as to be unable to support the farmer's family, some of whom must needs leave their home for some months each year in order to earn labourers' wages elsewhere. The district is one where many landowners, *métayers*, and labourers are poor, and the soil is only of medium quality. Nevertheless, the greatest ambition of even the smallest farmer is always to extend his holding by dint of hard work and economy. It was at a time when the Feltre farmers were gradually falling into the clutches of money-lenders that the Society was formed with a capital of £94, divided into shares of £2 and £4 each. There are five classes of members, all with equal rights and duties, but the subscriptions are proportional to the resources of each member. Accordingly, whilst the membership amounted to 1,218 in 1896, only 31 paid the full subscription of one franc per month, 6 members paid half a franc, 15 paid 25 centimes, 67 paid 20 centimes, whilst no less than 1,099 members paid the minimum subscription of 10 centimes, or a penny per month.

The work of co-operation and mutual help, which are the *raison d'être* of the Society, comprises a sick-fund, a department for advancing small loans, one for supplying maize, and a co-operative store for general articles of food. In case of temporary sickness, payments are

made at the rate of fourpence a day for thirty days, a period which may, however, be renewed. Small loans varying from eight shillings to £2 are made at a rate of interest which may not exceed 5 per cent. The intention is to help those members who become migratory labourers as already explained, and although a large number of the borrowers are absolutely without means, the Society has not lost a penny during its six years' existence, a period during which there has been advanced a sum exceeding £4,000. The frequently recurring short crops of maize, which is the principal food grain of the population, have led to the creation of a *dépôt* whence the most necessitous members can be supplied, and thereby aided to resist the usurer. At the beginning of each season the council purchases on the most advantageous terms a stock of maize, which is divided amongst the five divisions of the Society for ultimate distribution to members, who naturally remit the value in due course. As regards the co-operative supply store, the Society is able to buy at wholesale rates food which is sold without any profit, but at a considerable advantage to the members. The good results of the Feltre Co-operative Society are stated to be better indicated by the local *Mont-de-Piété*, or municipal pawn shop, where, since the formation of the Association, the deposits have regularly decreased, viz., from 11,757 in 1890 to 10,569 in 1893, and to 7,796 in 1896.

Farm Animals in Chili.

The Chilian horse, which is of Spanish origin, is admirably suited for the saddle, and no improvement has apparently resulted from the introduction even of valuable stallions from England, France, and America. A certain number of the best animals are annually exported to Peru, Bolivia, Ecuador, Guatemala, and Colombia; a corresponding importation of cheaper horses being made from Argentina. The ass is almost unknown except in the poorer districts, where the price does not exceed eight shillings per head. Few mules are reared, but numbers are imported from the Argentine Republic. There are good cattle in

the south of Chili, where luxuriant pastures are found, but the animals tend to diminish in size in the more northern districts. The native breed is being gradually displaced by Shorthorns, which are more profitable as regards yield and quality of meat, although this breed is said to become acclimatised with difficulty, and its powers of reproduction apparently diminish. The home production of meat is insufficient to supply the demand, and although about 6,000 head of Chilian cattle are annually exported to Peru, over 100,000 head are received each year from Argentina. Sheep-rearing is a comparatively new, and as yet undeveloped, industry in Chili. The native breed of sheep, which is a very poor one, is being gradually improved by the importation of Merino and Lincoln rams. Sheep-breeding is carried on in the Magallen district. The native breed of pigs has been improved by the introduction of Yorkshire and Berkshire boars.

Hop Cultivation in Russia.

In several districts in the Russian provinces of Kieff and Volhynia the cultivation of hops was introduced by Czech immigrants purchasing and settling on land in 1880-90. Bringing with them as seed the best Bohemian brands, they caused the cultivation of hops to become a recognised industry, giving employment to a large number of people. They now complain that their trade has been practically ruined with the coming into force, in 1894, of the revised commercial treaty with Germany, by which the import duty on German hops was reduced from 93s. to 32s. per cwt. The growers lately petitioned the Minister of Finance upon the subject of their grievances, asking him to afford them assistance to replace their industry upon the footing it occupied previous to the German commercial treaty. In his reply, the Minister of Finance says that the treaty with Germany having been made for ten years, he cannot help them by re-enacting the former duty, and points out, among various other schemes, that the petitioners, instead of selling most of their harvest to the Nuremberg market, whence the hops are exported to other countries

and, as it often happens, sent back into Russia under foreign marks, should cultivate a direct export trade, suggesting the English market as likely to prove remunerative. The Volhynian hops are said to be superior to American hops, so that there ought to be no difficulty in competing against the latter. At present the cultivation of hops in Russia shows signs of dying a natural death, whereas up to 1893 the harvest showed an annual yield of something like 1,613 tons from an area of 8,100 acres. The area has now been reduced to 3,240 acres, yielding about 645 tons, and the average price in 1896 was about £25 per ton.

[*Foreign Office Report, Annual Series, No.* 1,980. *Price* 2½d.]

French Bounties on Flax and Hemp.

The French Government propose to renew for a period of six years, from 1898, the bounties which are now awarded in France for the cultivation of flax and hemp. A Bill was accordingly introduced on the 26th June last whereby it is proposed during the period in question to grant an annual sum not exceeding two million francs (say £80,000) to growers of the two above-mentioned crops; each individual allowance being regulated in proportion to the acreage sown, provided always that the sum awarded does not exceed 16s. 2d. per acre.

This proviso is an important innovation as regards the regulations which previously obtained, inasmuch as under the law of the 13th January, 1892, no bonus could be made to any grower whose crop of flax or hemp did not amount to 2½ roods. It soon became apparent, however, that the limit so selected was too high, for, although the acreage under flax and hemp exceeded 173,000 acres in 1892, the conditions of the grant limited its application to about 47,400 acres only, to which was accordingly awarded a bonus amounting to £2 2s. 9d. per acre. The minimum limit was consequently reduced in 1893 to ten ares, or about a quarter of an acre, and the acreage eligible for bounties rose gradually from 67,335 acres in 1893 to 87,794 acres in 1896, the bonus decreasing correspondingly. In 1896 a bounty of 23s. 4d. per

acre was paid in respect of 82,670 acres, and on the supposition that it is not necessary further to reduce the minimum limit, the French Government have now estimated at 88,000 acres the area for which may be claimed a bonus.

Agricultural Exports of Western Australia.

In a report prepared by the Commissioner of Crown Lands in Western Australia for the Royal Commission on Agriculture it is stated that the position of that colony as a probable exporting country of agricultural produce differs considerably from that of the other colonies, and that, owing to the large discoveries of gold and the consequent rather rapid increase in the consuming population, Western Australia is much more likely to require to import a portion of her food stuffs for the next eight or ten years than to contribute to the supply of agricultural produce for the markets of the United Kingdom. It seems that the development of the soil and the settlement of the land in the colony is a somewhat slow and laborious process, and does not as yet appear to keep pace with the increase of mouths requiring to be fed, and that section of the community smitten with the gold fever is said to show a decided distaste for settling down to the less exciting and more laborious occupation of cultivating the soil. The one possible exception to this condition of things may be the case of fat stock in the northern pastoral areas, where, it is pointed out, owing to the probable rapid increase in fat cattle, and perhaps sheep, no doubt efforts will be made to export the surplus to the continental markets of the Northern Hemisphere, and on account of the superior geographical position of Western Australia, as compared with the eastern colonies (saving some days of steam), success in landing them alive and in good order should be possible; but some few years will probably elapse before the surplus over and above the local requirements will necessitate these undertakings, and a further diverting factor may also arise in the efforts that are being made to create

and establish markets and a demand for Australian beef and mutton among the coloured races of Singapore, Batavia, and the East.

Bavarian Hop and Barley Show.

The Bavarian Hop and Barley Show will this year be held from the 8th to the 10th October, both days inclusive, in the Royal Industrial Museum at Nuremberg. The exhibits of hops and barley will be confined to the produce of Bavaria, but there will be an international section for the exhibition of plans of buildings, and machines and implements employed in the manipulation of barley and hops for brewing and other purposes.

Rooks and Seed Wheat.

Investigations were made in the spring and autumn of last year at the Neuburg Agricultural School with a view to protect newly-sown wheat against the depredations of rooks. A report which has lately been published on the subject indicates that very good results were obtained, both as regards germination of the plants and protection from rooks, when the seed was treated with the following preparation:—200 grammes of coal tar, 200 grammes of petroleum, and three litres of warm water per hectolitre of seed; the English equivalents being approximately $2\frac{1}{2}$ ounces of coal tar and of petroleum, and one quart of water, per bushel.

Danish Butter Exports in 1896.

In a Report on the Trade and Agriculture of Denmark for the year 1896, Captain James Boyle, Her Majesty's Consul at Copenhagen, states that the export of butter from Denmark in 1896 amounted to 133,150,000 lbs., which is an increase of 3,520,000 lbs. over that of 1895, but the increase

in imports was 1,920,000 lbs., and the home consumption was about normal, so that the increase in production over 1895 amounted to 1,600,000 lbs. This is said to be due to the fact that farmers are taking up dairying instead of fattening, as in the latter case they still find great difficulty in obtaining a suitable and profitable market for fat beasts.

Irish Agricultural Horses.

From the evidence put before the Commission on Horse Breeding in Ireland it appears that the pure-bred Clydesdale or Shire horse, so general in England, is very little bred in Ireland except in the neighbourhood of a few of the big towns, and it is to its absence and the use of lighter horses on the small farms of the country that the better breeding of Irish horses is in a great degree attributed. Cart-horses and half-bred cart-horses are largely bred from, and this is said to be due to the fact that these low class stallions usually stand at very low fees, and are consequently much more patronised than horses at higher fees, and that their foals, looking large and strong, are easily sold to small dealers in country fairs. According to the Registrar-General's returns large numbers of horses in Ireland appear to be used for agricultural purposes, in Ulster 88 per cent. being returned under that head, in Leinster 74, in Munster 85, and in Connaught 89 per cent.

Land Banks in Austria.

Ten years ago there were two Raiffeisen credit banks in Austria; in 1896 the number of these co-operative institutions in the several Austrian provinces was 1,018, with a membership of nearly 60,000. The loans advanced by the banks amounted in 1896 to £625,000 and their assets to £1,150,000.

REPORTS ON FOREIGN CROPS.

Crops in the United States.

The report of the Statistician of the United States Department of Agriculture for September furnished the following particulars as to the condition of crops in that country. The general average condition of wheat when harvested was 85·7, or 11·1 higher than last year's average.

The July returns as to maize indicated a decrease of 1·2 per cent. in the acreage as compared with last year. This estimate, which was preliminary, represented a decrease of about one million acres, the area being returned at 80,095,051 acres. The average condition was 79·3 on September 1, or 11·9 points lower than at the same period last year.

The average condition of rye when harvested was 90·1 as compared with 82·0 last year. The condition of oats when harvested was 84·6 or 10 points higher than at the time of harvesting last year. The consolidated returns received indicated that about one per cent. of last year's oat crop was still on hand. Of barley the average condition was 86·4 or 3·3 higher than last year. The area sown to buckwheat this year is 4·8 per cent. less than last year, or about 719,000 acres, while the average condition was 95·1 in September.

The condition of potatoes was returned at 66·7, which is a fall of 11·2 points from the August figure and 16·5 points worse than last year. The total area of the hay crop is said to be 1·9 per cent. below last year's crop, which would be equal to about 42,438,000 acres.

The apple crop was in the main very unfavourable, and the peach crop more or less of a failure. The average condition of the pastures was very high, reports from three-fourths of the States making it about 100.

CROPS IN INDIA.

The final general memorandum on the wheat crop of 1896-97 was issued on the 5th June, 1897. As regards Central and Western India, the situation remained substantially unaltered from what it was at the time of the March memorandum. In Berar and the Nizam's territory the crop had been a failure, and the information obtained from Central India was incomplete, but in the Central Provinces and Bombay the estimated out-turn represented about half an average crop. In the Panjab and the North-Western Provinces the late spring rains caused an extension of sowing and greatly benefited the crop, both on dry and irrigated lands; while in Bengal the final estimate of the yield was somewhat better than the forecast made three months earlier.

The failure of the autumn rains caused an extension of irrigation in the North-Western Provinces, Panjab and Sind, with beneficial results, and it is noticed that in portions of the North-Western Provinces wheat, being the more paying crop, was sown instead of gram, as the expense of irrigation seemed inevitable in the case of either crop, while in Bengal and Bombay some late sowings of wheat were made to replace rice or cotton that had already failed through drought. In Rajputana, on the other hand, previous experience of a succession of bad wheat harvests induced some cultivators to substitute gram for wheat.

The total area and yield of the season, so far as returns had been received, compare as follows with those of the preceding year and average; but no information had been obtained with respect to some of the important wheat-growing states in Central India:—

	Area in acres.	Yield in tons.
Average of five years ending 1894-95	26,735,884	6,925,830
1895-96	23,242,171	5,510,965
1896-97	18,002,091	4,760,521

The following table shows the area and yield for each province compared with last year, and an average of the

previous five years. The figures for Central India in 1896-97 are exclusive of the acreage and produce in districts from which no returns had been received :—

Provinces.	Area in Acres.			Yield in Tons.		
	Of current year's crop (1896-97).	Of previous year's crop (1895-96).	Average of five years.	Estimated yield of curent year, that is, of area in column 2 (1896-97).	Yield of previous year, that is, of area in column 3 (1895-96).	Average of five years
1	2	3	4	5	6	7
Panjab	6,584,300	6,893,400	7,347,320	1,872,066	1,753,766	2,147,861
North-West Provinces and Oudh	3,669,292	3,896,406	4,798,835	1,460,340	1,236,486	1,556,418
Central Provinces	1,898,022	2,714,454	3,884,225	324,755	368,038	672,219
Bombay	1,391,420	2,288,838	2,435,654	282,623	454,865	628,743
Sind	402,532	315,559	552,683	111,322	71,683	179,395
Berar	381,425	747,025	901,515	11,841	48,549	85,819
Bengal	1,273,300	1,427,400	1,464,000	373,600	345,600	473,800
Rajputana	1,219,139	1,306,868	1,511,571	271,286	315,573	372,968
Central India	329,352	2,085,067	2,384,831	28,332	823,157	709,573
Hyderabad	849,438	1,561,698	1,451,979	23,943	92,885	98,735
Mysore	3,871	5,456	3,271	413	363	299
Total	18,002,091	23,242,171	26,735,884	4,760,521	5,510,965	6,925,830

CROPS IN AUSTRIA.

According to the report issued by the Austrian Ministry of Agriculture in the middle of July, the rye crop varied much in condition in different districts, but the yield was expected to be an average one. In the case of wheat the prospects were generally similar to those for rye, but rust had been unusually prevalent. The harvesting of the crop had already begun in some of the central and northern districts. Barley was reported to be very unequal, its condition largely depending upon the date of sowing. Early sown barley had, as a rule, done well, but that sown in the last fortnight of May frequently presented a very unsatisfactory appearance. Maize was in good condition except in some of the eastern districts. Peas and beans were up to the average.

Potatoes were considered to promise an average crop; roots were indifferent.

The hay crop had turned out very satisfactorily, both as regards quality and quantity, but grasses under rotation were not promising, as they had suffered much from drought.

Hops were generally below the average, and in some provinces much below.

The official estimate of the produce of the principal crops in Austria in 1896 were published in August last. From these it appears that the produce of wheat was 41,667,000 bushels, of rye 68,719,000 bushels, of barley 53,979,000 bushels, of oats 90,201,000 bushels, and of maize 16,438,000 bushels.

CROPS IN HUNGARY.

In the *Wiener Landwirthschaftliche Zeitung* of August 21st last it was stated that the reports received by the Ministry of Agriculture at Buda-Pesth showed that the grain and root crops in Hungary had been seriously injured by the floods in many districts, while the great heat and heavy rains had also tended to darken the propects of a good harvest. Wheat was expected to yield 89,723,000 bushels from an area of 7,285,000 acres, or about 12·3 bushels per acre. In 1896 the wheat harvest yielded 141,883,000 bushels. The quality of this year's crop is, for the most part, indifferent. Rye was estimated to produce 32,743,000 bushels, as compared with 48,247,000 bushels last year. Barley was reported to be of average quality, and a yield of 39,600,000 bushels was looked for; in 1896 this crop produced 53,370,000 bushels.

Oats were, for the most part, of good quality, and the yield this year was calculated to amount to 47,949,000 bushels. Maize was an average crop; hemp and flax were satisfactory; roots promised an average yield; and potatoes were expected to prove up to the average.

CROPS IN DENMARK.

According to reports published in the *Ugeskrift fur Landmaend*, the heavy rains in the first fortnight of August interfered with harvesting operations in Denmark, but

beyond delaying the carrying of the crops no serious damage appears to have been done. Wheat is considered to have furnished a good yield on the whole, though the ears were generally small. Rye and oats appear to have been very unequal, and no estimate of a general character as to this season's production of these grains could be made. On light lands oats proved, as a rule, to be imperfectly developed and very short in the straw.

Roots and potatoes were reported to be flourishing at the end of August, and turnips were doing particularly well.

Meadows and grasses generally were in good condition.

CROPS IN FRANCE.

The latest official information relating to the condition of the French crops refers to the middle of July. At that time the condition of the winter wheat crop was reported to be good or fairly good in sixty-four departments, passable in twelve, and indifferent in eight. The condition of this crop in the south-western district was less satisfactory than in other parts of the country, the average condition of nine departments being passable, and the crop in Dordogne, Lot-et-Garonne, and Landes being reported to be indifferent.

Spring wheat was also stated to be in a good or fairly good condition in most of the departments where this cereal is grown. Similar favourable reports were received from sixty-five departments as to barley and rye, and from sixty-nine departments as to oats.

The potato crop in six departments was very good, and good or fairly good in sixty-eight departments. In nineteen departments the permanent pasture was reported to be in a very good condition, and good or fairly good in fifty-seven departments. The rotation grasses also appeared to be in a satisfactory condition.

NOTE.—Since the above was printed the Board have received a copy of the official preliminary estimate, published on September 14th, of the results of this year's harvest of wheat, mixed corn, and rye in France. The yield of wheat is estimated to have amounted to 243,531,000 bushels, or 85,760,000 bushels short of last year's crop.

CROPS IN GERMANY.

According to the report issued by the Imperial Statistical Bureau at the end of August, the rye harvest in Germany was then over, and the harvesting of wheat had commenced. The yield was almost everywhere below expectations, but spring-sown grain turned out much better than the winter-sown wheat and rye. Winter-rye had suffered from drought and bad weather, much of it being laid. Winter-wheat was not so seriously affected. Oats were expected to yield a crop much below the earlier estimates. Barley in districts visited by the heavy rains was found to be of inferior quality and unfit for brewing purposes, but a good crop was secured in Wurtemberg.

Potatoes were reported to be generally in good condition, and there was very little disease. Clover had recovered after the rains, and a satisfactory supply of autumn fodder was forthcoming. Rotation grasses also were looking well, and promised to be a good crop.

CROPS IN ROUMANIA.

The damages caused to the Roumanian crops by the floods and heavy rains in the early part of the season have turned out to be less serious than was expected, as a succession of warm days after the rains, which ceased at the end of June, materially improved the condition of the crops in many localities where they were considered to be lost.

From the results of an official inquiry, it appears that wheat will, after all, probably return a good average yield, and much of it will be of excellent quality. The crop most injured by the rains is colza; but the harvest of maize, beetroot, and beans will be retarded.

Later reports, received in August, indicated that the wheat harvest had been completed under favourable conditions, and that the fears entertained as to a dearth of forage in the autumn would prove to be groundless.

CROPS IN ITALY.

According to the official reports published in the *Gazetta Officiale* of 13th August last, the wheat harvest in Italy will prove to be below the average, the crop being a short one nearly all over the country. Maize had benefited from the rains in July, and it was hoped that a good crop would be obtained.

Hemp and olives were expected to furnish indifferent yields. Grapes were not abundant, but of fine quality.

CROPS IN MANITOBA.

The Department of Agriculture at Winnipeg has published the following statement, showing the extent of the cultivated area in Manitoba during the last three years.

CROP.	1897.	1896.	1895.
	Acres.	Acres.	Acres.
Wheat - - - -	1,290,882	999,598	1,140,276
Oats - - - -	468,141	442,445	482,658
Barley - - - -	153,266	127,885	153,839
Flax - - - -	20,653	20,325	82,668
Potatoes - - -	13,576	12,260	16,716
Roots - - - -	6,130	6,715	6,685

The conditions for seeding were exceedingly favourable this season. As soon as snow disappeared the land was ready for seed, and work was carried on without interruption.

In a bulletin issued by the Agricultural Department on August 20th, the yield of wheat this year is estimated at 21,284,000 bushels.

CROPS IN RUSSIA.

The reports published in August relating to the condition of the crops in European Russia were somewhat conflicting, but there seems little doubt that the rye harvest of this season is below the average, though how much below it is as yet difficult to estimate until more complete details are

available. Winter-wheat is apparently very indifferent, and some authorities think that it will not yield more than half an average crop. Spring wheat, on the other hand, which constitutes over two-thirds of the wheat production of Russia, promises to be nearly up to the average both in quantity and quality. Oats also are expected to turn out a full average crop.

Generally speaking the harvest is estimated to be inferior to that of 1896, and in many parts of the eastern provinces the deficiency of the rye crop is causing some anxiety, lest there should be a repetition of the difficulties which accompanied the season of 1891.

In the North and South Caucasus the cereal harvest is reported to be under the average.

PARLIAMENTARY PUBLICATIONS.

Board of Agriculture.—Annual Report of Proceedings under the Diseases of Animals Acts, the Markets and Fairs (Weighing of Cattle) Acts, etc., for the year 1896. [C.—8389.] *Price* 10*d.*

This volume contains the reports of the Chief Veterinary Officer and the Principal of Animals Division of the Board of Agriculture, together with a series of statistical tables showing the number of outbreaks of contagious diseases of animals in Great Britain and the trade in animals of the United Kingdom and of foreign countries.

In the report of the Chief Veterinary Officer a history is given of the progress of Swine Fever in Great Britain, and the etiology, pathology, and morbid anatomy of the disease are discussed. The report contains two coloured plates illustrating the appearance of swine-fever lesions in the tongue and epiglottis.

The report of the Principal of the Animals Division relates to the duties undertaken by the executive staff. An account is given of the various Acts which have been passed with the object of preventing the introduction of disease by the importation of live animals, and the effect of the Foreign Animals Order of 1896 is commented upon. The remainder of the report deals with the work done by the Board in connection with the regulations for the protection of animals in transit by sea and land; the administration of the Acts relating to contagious diseases of animals in Great Britain; and the execution of the provisions of the Markets and Fairs (Weighing of Cattle) Acts. In connection with the latter Acts, the Principal observes that there has been perhaps a little more

attention shown recently to the subject of selling by live weight, but that any feeling that may have been awakened in its favour has not, so far, led to any considerable results. So far as the Board are informed there is up to the present only one auction mart where the sale of cattle is habitually conducted by live weight, and in the large majority of cattle markets throughout the country the practice of selling animals by live weight is one, unfortunately, that is almost unknown.

Coloured diagrams are appended to the report showing the number of outbreaks of swine fever and rabies reported upon in 1896.

Report of the Progress of the Ordnance Survey to the 31st March, 1897. [C.—8555.] *Price* 3*s.* 3*d.*

This report deals with the progress made in the survey in Great Britain and Ireland, and contains particulars of the Ordnance Survey Maps already published. Since January 1st, 1897, the Ordnance Survey Department has taken over the control of the sale of these maps, and agents have been appointed for London, Edinburgh, Dublin, and all important provincial towns. Arrangements have also been made with the Post-Office, under which the public can order the maps at 492 head post-offices in England, 138 head offices in Scotland, and 116 head offices in Ireland, exclusive of the towns for which agents have been appointed. Under these arrangements any member of the public can fill up an order for the maps he requires at the post-office, paying their cost, with that of the necessary postage, etc., to the local post-master, who remits the order and the amount to the Ordnance Survey Office at Southampton or Dublin, from which the maps are then issued direct to the purchaser.

Booksellers and the trade generally are allowed to order maps direct from Southampton, receiving 25 per cent. discount; but they have to prepay the cost of the maps and

of their carriage, except in the case of large orders, in which latter case the carriage is paid by the Department.

Universities and College Estates Acts.—Report of the Departmental Committee appointed by the Board of Agriculture to inquire into the Working of the Universities and College Estates Acts, 1858 *to* 1880, *and to Report whether any, and if so what, Amendments therein are Desirable.* [C.—8646.] *Price* 1½*d.*

The Committee state in their report, dated 6th August, 1897, their opinion, as the general result of their inquiry, that there is not only ample scope, but also a considerable need, for a measure to amend the above-mentioned Acts, both by simplifying the terms in which they are expressed, and by extending the powers of the Board of Agriculture to sanction and facilitate transactions for the development of the most valuable portions of the estates of the universities and colleges, which transactions have become of far greater importance and urgency of late years on account of the fall of the rents of the agricultural portions, and the change from beneficial leases to a more direct control by the universities and colleges of their properties.

Final Report of Her Majesty's Commissioners appointed to inquire into the subject of Agricultural Depression. [C.—8540.] *Price* 3*s.* 1*d.*

This report is divided into five parts. Part I. deals with the distribution and effects of agricultural depression; part II., with the causes of depression; part III., with miscellaneous subjects bearing on the agricultural position; part IV. is a summary of the recommendations of the Commission; and part V. is a supplementary report on the relation of monetary changes to agricultural depression. Parts I. to IV. inclusive constitute the main report, which is signed by

fourteen of the sixteen Commissioners. Part V. is signed by ten of the Commissioners whose signatures are appended to the main report. The remaining two Commissioners present separate reports.

In the main report it is stated that agricultural depression has not equally affected all parts of Great Britain. The situation is regarded as a grave one in the eastern and in some parts of the southern counties of England, while in the arable section of Scotland great losses have also been experienced during the past twelve years. In the pastoral counties the depression is said to be of a milder character, but there, also, farming profit and rents have been largely diminished; but in districts suitable for dairying, market gardening, and poultry rearing, and in the neighbourhood of large consuming centres there has been relatively less depression than elsewhere. As regards the effects of the depression upon the interests of the classes connected with the land, owners are shown to have been affected by the decline in the rental and capital value of land, and tenant farmers have suffered from the depreciation of the value of farm stock, and the diminution of farming profits. In the case of the agricultural labourer, the effect of the depression has been chiefly seen in a reduction of the number of men employed, and a greater irregularity of employment.

The Commissioners express their entire concurrence in the opinion that the present crisis in agriculture is due primarily to the fall in prices of agricultural produce. A chapter is devoted to an examination of the changes in the prices of farm products during the past twenty years, and the following general conclusions are arrived at:—

(*a*). That the changes in the prices of grain during the past twenty years represent a fall of over 40 per cent. in the three staple cereals, and of over 50 per cent. in the case of wheat.

(*b*). That in the price of beef there has been in the same period a fall ranging from 24 to 40 per cent., according to quality.

(*c*). That the prices realised for mutton since 1882-84 have exhibited a progressive decline of from 20 to 30 per cent.

(*d*). That there has been a fall in the price of wool amounting to upwards of 50 per cent. during the past twenty years.

(*e*). That dairy produce has participated in this depreciation, and that, taking the changes in the prices of milk, butter, and cheese as a whole, there has been a fall approaching 30 per cent.

(*f*). That the fall in the staple products already referred to has been accompanied by a decline of at least 20 to 30 per cent. in the price of potatoes.

(*g*). That although there have been fluctuations in the prices of hops, they have exhibited in recent years a general tendency to fall to an unprofitable level.

The Commissioners think it important to note that there has been a general correspondence between the fall in prices and the intensity of foreign competition. They show that there has been a remarkable increase in the imports of all forms of agricultural produce, and that this expansion has been accompanied in nearly every case by a contraction in the prices of the several articles concerned. Of the various products of British agriculture wheat has been most affected by this development, the foreign supply of this grain having gradually displaced the home production until the latter now constitutes barely 25 per cent. of the quantity needed for consumption annually in this country. As regards meat, there has been apparently no actual displacement of the home produce by the growth of the imports, the supply of foreign beef and mutton meeting a demand for cheap meat not hitherto satisfied by the home production. In the case of dairy produce, the importation of butter, margarine, and cheese is estimated to represent more than 50 per cent. of the annual supply. The condition of agriculture in the several countries exporting farm produce to the United Kingdom is discussed in some detail.

The Commissioners have endeavoured to indicate the remedies for some of the disadvantages under which agriculture still labours, and among the subjects dealt with in their recommendations are the Agricultural Holdings Act, 1883, Tithe Rent Charge, Railway Rates, Damage by Game, the Sale of Adulterated Products, and the Sale of Imported Goods as Home Produce. They also recommend that more assistance should be given to the Board of Agriculture for the employment of correspondents both in this country and abroad, and that the Board should be entrusted with more ample powers of control and inspection over the whole system of technical agricultural education.

Potato Disease.—Report of Experiments and Demonstrations conducted by the Irish Land Commission (Agricultural Department) during the season of 1896, *in the prevention of Potato Disease.* [C.—8505.] *Price* 1½*d.*

This is a report of the experiments conducted by the Irish Land Commission during the months of June, July, August, and September, 1896, for the purpose of demonstrating to agriculturists the proper methods of applying Bordeaux mixture to the potato plant for the prevention of potato disease, and the advantages which may be derived therefrom.

Demonstrations were conducted on twenty farms in the counties of Antrim and Down, and on fifteen farms in Meath, Queen's County, Kilkenny, and Wicklow.

The Bordeaux mixture used for the demonstrations carried out in Antrim and Down was made with copper sulphate and lime; that used for the other demonstrations was made in some instances with copper sulphate and lime and in others with copper sulphate and carbonate of soda. In some instances the first dressing contained 1½ per cent. of copper sulphate, but a 2 per cent. mixture was used for the remainder of the first, and for all the second, dressings.

The amount of dressing applied per statute acre varied, in proportion to the extent to which the foliage had developed, from eighty to one hundred and seventy-four gallons.

The copper sulphate and lime mixture was prepared in the same manner as for the similar demonstrations conducted by this department during the past few years; the copper sulphate and soda mixture was prepared similarly, the differences in practice being as follows:—For the copper sulphate and lime mixture, lime water is prepared by mixing with water one pound of unslacked lime for every two pounds of copper sulphate used, but when carbonate of soda is used instead of lime, three pounds of carbonate of soda for every two pounds of copper sulphate used are dissolved in water, producing a solution of carbonate of soda. The soda crystals may be dissolved slowly in cold water or they may be rapidly dissolved in boiling water, but in the latter case sufficient cold water must be added after dissolution to thoroughly cool

the mixture. The soda solution is added to the copper sulphate solution precisely as is the lime water when preparing the mixture with copper sulphate and lime in the ordinary way. The carbonate of soda used was that usually sold as washing soda.

The results obtained confirm the experience gained by the demonstrations and experiments conducted in previous years, namely, that the proper application of a correctly prepared Bordeaux mixture to the potato crop by means of suitable spraying machines before the appearance of disease, though not entirely preventive of disease, has a marked effect in lessening the loss of yield and quality that usually results therefrom, and that under such circumstances the increase of yield due to the spraying usually considerably more than pays for the cost of application. During 1896, as in former years, potato disease was more or less prevalent in those districts in which experiments or demonstrations in connection therewith were carried out for the Irish Land Commission, and manifested itself to some extent on all the plots on which demonstrations were conducted.

The results obtained on those plots which were treated with Bordeaux mixture made with carbonate of soda show that it is probably as efficacious as the copper sulphate and lime mixture.

Agricultural Produce (Marks) Bill. Report and Special Report from the Select Committee on the Agricultural Produce (Marks) Bill; with the Proceedings of the Committee. [*H.C.*—365.] *Price* 1*d.*

The Select Committee of the House of Commons, to whom the Agricultural Produce (Marks) Bill was referred, issued on July 29th last a special report which states that the Committee are of opinion that the identification of foreign meat and cheese is desirable, and that there would be no great difficulty in carrying this out in the case of foreign carcases and cheeses.

The Committee are also of opinion that any legislation in

the direction of marking meat would be inadequate unless means be taken to distinguish between British or Irish meat on the one hand, and on the other (1) that produced in our Colonies; and (2) that produced in all other countries and landed here alive, to be slaughtered at the port of debarkation.

Report by the Commissioners appointed to inquire into the Horse-Breeding Industry in Ireland. [C.—8651.] *Price* 3½*d.*

This is the report of the Commission appointed by the Lord-Lieutenant of Ireland, on July 20th, 1896, to examine upon the methods which should be adopted for the encouragement and improvement of the breed of horses in the various districts of Ireland. The recommendations of the majority of the Commissioners are summarised as follows:—

1. That it is desirable for the welfare of the country that greater aid should be given by the State to the industry of horse-breeding.

2. That a system of registration of stallions, similar to that now in operation under the Royal Dublin Society's scheme, should be established in a more extended form.

3. That money should be spent in distributing stallions where wanted throughout the country, and giving premiums to private owners of suitable sires.

4. That substantial premiums should be given to brood mares, especially those between the ages of three and six.

5. That additional prizes should be given in the early spring to yearlings.

6. That the encouragement of Hackney stallions should not be continued at the public expense.

7. That all money devoted by the Government to the encouragement of horse-breeding should be administered by one Department or Body, acting through local bodies, and satisfying local requirements, as far as is consistent with the welfare and improvement of the industry as a whole.

The minority report, which is signed by five of the Commissioners, concludes with the following suggestions:—

1. That, in any scheme for the improvement of agriculture in Ireland, the peculiar adaptability of the country to produce every kind of horse, and the importance of the horse-breeding industry, would warrant the making of a separate and substantial grant for its advancement.

2. That, in the application of this grant, the needs of each class of breeder should be recognised. By giving, say, to the hunter breeder, a thoroughbred, or approved Hunter sire; to the cart-horse breeder, a suitable agricultural stallion; or to the breeder of harness horses a Hackney.

3. That, in the selection of the particular breed of stallion or stallions for each locality, the wishes of the breeders of horses in the locality should be consulted.

4. That the grant should be applied in purchasing or subsidizing stallions of different breeds to be approved of by a Central Committee; and to the giving of prizes at county shows for brood mares and young stock the produce of such stallions.

5. That a list of stallions purchased or subsidized by Government or registered under the scheme of the Royal Dublin Society, be submitted each year by the Central

Committee to the County Committees for publication, all such stallions to be certified as free from hereditary diseases by a Central authority, and no mares to receive nominations until passed as suitable for breeding.

6. That registration should be established on the lines of the English breed societies with carefully devised rules, under which approved half-bred mares and approved half-bred sires, not at present eligible for any stud book, could be registered as foundation stock, so as to protect every breeder against any strain of blood to which he might object.

7. That all horses coming into the United Kingdom from America should be branded, in such a place as not to disfigure the horse, but to be easily distinguishable.

Congested Districts Board for Ireland, Fifth Report, 1895-6. [C.—8191.] *Price* 3½*d.*

In the section of this report which relates to agriculture, it is stated that the number of example-holdings has been reduced from twenty to eleven, of which six are in the County Galway and five in the County Mayo, but numerous example-plots and experimental-plots have been substituted. The cost of working an entire farm or holding as an example is very large compared with the expenditure in connection with an experimental plot or portion of a holding; and it is therefore considered that, while some example-holdings might be continued, more instruction can be given with the same amount of money by means of widely diffused example-plots than through example-holdings. At the same time it is the present intention of the Board to continue to work a few of the latter, as one such farm in a good situation serves as a pattern for a very large district.

Fifty-nine example-plots are managed by the Board—thirty-six in the County Donegal and twenty-three in the County Galway. The occupier of each plot is supplied by the Board free of cost with sufficient seed and artificial manure on condition that the plot shall be worked at all stages under the direction of the Board's local Instructor. In this way each plot affords a demonstration of the advantage gained by the use of good seed and suitable manures in conjunction with improved systems of tillage and cultivation. It is comparatively easy to induce a small occupier to try an experiment on a small plot with one crop, though he

would be unwilling to take the same trouble, and, according to his view, to run the same risk for the entire, or for a large part, of his farm. As this system makes its way it is likely that smaller inducements will suffice to encourage occupiers to develop their land according to the most skilled methods. Even now small farmers have been induced to carry out improvements by drainage, reclamation, or fencing, on the understanding that, if the work were satisfactorily done, an example-plot would be taken up by the Board on the holding. In such cases a permanent or lasting improvement is effected in the value of the land, over and above the consideration that a well-tilled plot will be maintained for the instruction of the locality. It has also been found that in some cases the neighbouring occupiers who observe the carrying-out of such improvements follow the example, either from a healthy spirit of rivalry or because they are convinced that they will make money by doing so.

In their last report the Board stated that they intended to try to create a greater general interest in the example-plots by subdividing some of them for the purpose of comparing the relative merits of applications of different manures or of different systems of treatment. Arrangements have been made for working about one hundred and fifty experimental plots according to this method—(1) for the cultivation of wheat of different varieties; (2) for the comparative use of various manures in the growing of potatoes, turnips, and mangolds respectively, and for top-dressing grass-land; for growing different kinds of grass and clover seeds; and for the use of lime to prevent "finger-and-toe" in the turnip crop. The sub-plots, as they may be called, are about twenty perches in area.

Agricultural Statistics, Ireland, with detailed Report on Agriculture for the year 1896. [C.—8510.] *Price* 1*s.* 2*d.*

The statistics of acreage and produce of the crops and of live-stock in Ireland in the year 1896 contained in this volume have been already reproduced in this Journal.

With regard to the number and size of holdings, it is stated

that the number of separate holdings was 575,664, being 878 more than in the previous year. The increase was chiefly apparent in holdings under one acre, whilst decreases took place in the number of holdings between one and thirty acres.

The increase during recent years in the number of dairy factories appeared to render it desirable that some particulars should be obtained regarding what is now an important agricultural industry. The statistics obtained showed that the number of factories was 279, being an increase of 24 as compared with the number returned in 1895, and that the number of hands permanently employed amounted to 2,205, or 243 more than the number for 1895. Of the 279 factories, 119 were owned by individual proprietors, 88 were the property of joint stock companies, and 72 belonged to co-operative farmers. Milk-separators to the number of 605 were employed, and the quantity of butter produced during the year ended 30th September, 1896, was 274,592 cwts., against 206,068 cwts. in the preceding year. Condensed milk was also produced to the extent of 26,040,465 lbs. The quantity of milk manipulated in the course of the year was 67,242,217 gallons, and 372,275 gallons of cream.

With regard to bee-keeping, the quantity of honey produced was 238,171 lbs., which was much below the average for the preceding ten years, the average for 1885-94 being 306,687 lbs. The number of stocks brought through the winter of 1895-96 was 17,026 as compared with 17,317 in the preceding year.

The number of mills for scutching flax in Ireland in 1896 was 933, being a decrease of 18 compared with 1895, and a decrease of 145 since the year 1887.

Merchandise Marks.—Report from the Select Committee on Merchandise Marks, with the Proceedings of the Committee and Minutes of Evidence. [*H.C.*—346.] *Price* 3*s.*

The Select Committee appointed to inquire into the effects and operation of the Merchandise Marks Act, 1887, and into the subject of Merchandise Marks generally, in their report

dated 27th July last, state (*inter alia*) that they are satisfied that the operation of the Merchandise Marks Act of 1887 has been on the whole beneficial, and that there is abundant evidence that it has to a great extent stopped the fraudulent practices against which it was directed. The effect of those portions of the Act referring to the imitation of proprietary trade marks and false trade descriptions has been especially beneficial. The establishment and observance of higher standards of honesty has tended to inspire a confidence in the accuracy of the marks placed upon British goods, and to enlarge to that extent, and give stability to, the trade of British merchants and manufacturers. Notwithstanding, therefore, that the competition of improperly marked foreign goods is still in some cases injurious, and that merchandise marks legislation has made little progress outside the United Kingdom, India, and the British Colonies, the balance of the evidence is in favour of retaining the greater portion of the Act.

Moreover, the Act is now well understood both at home and abroad; many of the objections which were made to its wording have been met by adjustments in practice, and the Committee strongly deprecate any change in its chief provisions relating to the importation of goods for use in the United Kingdom.

The Committee having received much evidence of the advertisement of the merchandise and products of foreign countries, owing to the present requirement of the specification of the particular country of origin, and of the disadvantage caused to British merchants and dealers by the consequent disclosure of trade secrets, and the loss to and discouragement of British business enterprise, are of opinion that the primary objects of the Act, viz., the protection of British manufacturers and purchasers against fraud by the sale of foreign merchandise as British, would be substantially gained, and British trade enterprise (especially in the very needful increase of British commercial travellers and agents abroad and in the Colonies) improved by substituting for the specification of the country of origin the words "Made abroad."

Dangerous Trades (Anthrax) Committee. Report of the Departmental Committee appointed to inquire into the conditions of work in wool-sorting and other kindred trades. [C.—8506.] *Price* 1*s.*

This is the report of a Committee appointed by the Home Office to inquire into the conditions of work, as they affect the health of the operatives, in industries in which anthrax is alleged to occur.

The Committee describe briefly the nature of anthrax, and make various suggestions with a view to minimising the risk of contracting the disease which is incurred by operatives manipulating wool, hides, hair, and similar animal products. The Committee hold that there are three principal directions from which the question of prevention may be approached—viz., the exclusion of infected materials from use, disinfection, and the employment of insusceptible persons. They point out that so far as British materials are concerned there does not appear to be much risk of anthrax, as the disease is not widely prevalent here, and since 1886 it has been scheduled under the Contagious Diseases (Animals) Act. They consider it desirable that some action should be taken to check the importation of dangerous hides, which they think would be the most effectual means of diminishing the risk of the disease. The suggestion of disinfection, promising as it may appear at first sight, does not, in the opinion of the Committee, bear examination, owing to the difficulty of applying disinfection in a satisfactory manner to the materials with which their inquiry is concerned.

In conclusion, the Committee state that the evidence which they have collected from different quarters has led them to attach the greatest importance to the subject of anthrax, which they venture to suggest, on public grounds, could more advantageously be investigated by a Royal Commission, or at least by a Committee, on which the Foreign Office, the Local Government Board, the Board of Trade, and the Board of Agriculture might usefully be represented, as well as the Home Office. They add that there is reason to believe that by such a court of inquiry means might be discovered of actually stamping out the disease in the country, or at least of materially reducing the frequency of its outbreaks.

PRICES OF LIVE STOCK

Returned Under the Weighing of Cattle Act.

Returns of prices collected under the Markets and Fairs (Weighing of Cattle) Act, 1891, for the second quarter of the year 1897 are now available, and the following comparisons with previous data, similarly supplied to the Board of Agriculture, are published for general information. The total numbers of animals returned as entering, weighed, and priced at the nineteen places in Great Britain scheduled under the statute, in the second three months of 1895, 1896, and 1897 compare as follows:—

Animals.	2nd Quarter, 1897.	2nd Quarter, 1896.	2nd Quarter, 1895.
Cattle:	No.	No.	No.
Entering markets	280,275	268,864	298,040
Weighed	29,685	28,859	26,063
Prices returned	27,728	27,201	23,505
Prices returned with quality distinguished	20,941	19,737	15,996
Sheep:			
Entering markets	1,119,015	1,136,350	1,131,996
Weighed	13,336	13,130	10,929
Prices returned with quality distinguished.	12,060	11,425	5,583
Swine:			
Entering markets	30,423	58,670	58,943
Weighed	471	1,634	636
Prices returned	213	620	301
Prices returned with quality distinguished	213	620	—

The total numbers weighed thus continue to show a slight increase in cattle and in sheep, but the cases in which pigs were weighed in this quarter are again much fewer. As, however, the whole number of cattle entering the nineteen

markets is greater than in the same months of 1896 the percentage weighed would appear to be fractionally less. The comparison with 1895 is much more favourable in this respect.

In the general table on page 272, the numbers weighed and priced respectively at each scheduled place in the past quarter are shown in detail, and attention may again be drawn to the absence of any single case of cattle weighing at Birmingham, and to the very small numbers reported from Lincoln and York. Sheep also were weighed at only four of the fourteen English markets, but an improvement in the numbers of sheep weighed at Leeds may be regarded as worthy of note. From the Scotch and English totals in the same table it will be noticed that both in the case of cattle and of sheep much fuller returns continue to be received from Scotland—where the system of auction marts largely prevails—than from the English markets. This feature has been remarked on all previous occasions on which comments have been made on these live weight returns.

For ten of the nineteen scheduled places a sufficient report of cattle prices is again forthcoming to enable a statement of average current value to be given, in the form previously employed, although the quotations in the third or inferior class, as on some former occasions, rest on too small a number of transactions to be accepted as satisfactory at either Leeds, London, Newcastle, or Shrewsbury, while the local classification in use in Glasgow and Perth appears to present points of difference from that adopted elsewhere.

Places.	Inferior. (3rd Quality.)			Good. (2nd Quality.)			Prime. (1st Quality.)		
	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.
		s. d.	*s. d.*		*s. d.*	*s. d.*		*s. d.*	*s. d.*
Leeds	14	3 6	28 0	53	3 7½	29 0	134	4 0½	32 4
Liverpool	95	3 2¾	25 10	101	3 10¼	30 10	450	4 3	34 0
London	6	3 10½	31 0	199	4 7¼	36 10	1,094	5 0½	40 4
Newcastle	13	3 5½	27 8	14	4 1½	33 0	954	4 6¼	36 6
Shrewsbury	6	3 1	24 8	51	3 9¼	30 6	60	4 4¼	34 10
Aberdeen	1,126	3 2¼	25 6	3,553	4 1¾	33 0	2,399	4 6¼	36 2
Dundee	144	3 7½	29 0	1,775	4 0¾	32 6	1,470	4 4¼	34 10
Edinburgh	—	—	—	2,378	4 4¼	34 10	416	4 5½	35 8
Glasgow	279	4 1¾	33 2	582	4 3	34 0	557	4 6	36 0
Perth	102	4 1¼	32 10	468	4 4¼	34 10	362	4 6½	36 4

Employing these data for comparative purposes, a table, such as is subjoined, indicates a general rise in the price of fat stock, varying in extent, however, at different places. In the two upper grades, for which the figures are most reliable, there is an increase everywhere except in Leeds, where the quotation of 29s. 10d. per cwt. given for the second three months of 1896 is reduced to 29s. in the like months of 1897. In the London market, on the contrary, the rise between 1896 and 1897 is from 33s. 4d. to 36s. 10d. in second quality cattle and from 36s. 10d. to 40s. 4d. in prime stock. The last figure is the highest average shown in any of the ten places selected :—

Places.	Inferior or Third Quality.		Good or Second Quality.		Prime or First Quality.	
	1897.	1896.	1897.	1896.	1897.	1896.
	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.
Leeds	28 0	27 10	29 0	29 10	32 4	32 0
Liverpool	25 10	—	30 10	29 2	34 0	33 0
London	31 0	27 0	36 10	33 4	40 4	36 10
Newcastle	27 8	25 8	33 0	29 10	36 6	33 10
Shrewsbury	24 8	27 0	30 6	30 4	34 10	—
Aberdeen	25 6	24 2	33 0	31 4	36 2	34 6
Dundee	29 0	25 0	32 6	30 8	34 10	32 10
Edinburgh	—	—	34 10	32 6	35 8	32 8
Glasgow	33 2	31 6	34 0	32 0	36 0	34 6
Perth	32 10	30 4	34 10	32 2	36 4	33 10

The sales of cattle reported as being by actual live weight amounted to 928 out of the 27,728 transactions returned, and 748 of these were of cattle classed as prime, 365 of this grade being returns from Dundee alone and 150 from London.

In only one instance, that of Shrewsbury, so far as the returns received by the Board show, was any considerable number of store cattle reported as having been passed over the weigh-bridge. In that place prices have been supplied for 61 inferior, 759 second class, and 660 prime stores, those given for the several grades averaging respectively 26s. 2d., 30s. 6d., and 35s. 10d. per live cwt.

The general statement of animals entering, weighed, and priced during the second quarter of 1897 is given in the following table :—

TOTAL NUMBER of **Cattle, Sheep,** and **Swine** entering the MARKETS and MARTS of the under-mentioned Places in ENGLAND and SCOTLAND, with the Number WEIGHED, as received from the Market Authorities in the **Second Quarter,** 1897, under the Markets and Fairs (Weighing of Cattle) Act, 1891 (54 & 55 Vict. c. 70).

PLACES.	Cattle.			Sheep.			Swine.		
	Total Number entering the Markets or Marts.	Number Weigh'd	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weigh'd	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weigh'd	Number Weigh'd for which Prices were given.
ENGLAND.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
Ashford	3,417	79	—	26,873	—	—	2,550	—	—
Birmingham	8,399	—	—	22,784	—	—	255	—	—
Bristol	16,858	51	51	35,444	—	—	33	—	—
Leicester	20,571	163	129	18,767	—	—	803	5	5
Leeds	7,427	201	201	39,450	1,486	1,486	1,019	258	—
Lincoln	2,630	6	6	22,148	—	—	2,858	—	—
Liverpool	8,119	646	646	75,599	1,075	1,075	—	—	—
London	17,645	2,669	1,299	187,050	1,066	—	575	—	—
Newcastle-upon-Tyne	25,835	981	981	86,792	—	—	5,791	124	124
Norwich	26,764	161	161	64,511	—	—	3,644	—	—
Salford	25,817	173	173	170,734	—	—	183	—	—
Shrewsbury	10,892	1,852	1,597	10,689	—	—	891	—	—
Wakefield	16,166	93	—	62,602	195	—	—	—	—
York	17,587	2	—	25,593	—	—	—	—	—
SCOTLAND.									
Aberdeen	16,332	7,078	7,078	64,192	6,140	6,140	4,272	—	—
Dundee	4,854	3,479	3,473	6,279	1,266	1,266	478	—	—
Edinburgh	18,755	6,504	*2,796	60,267	—	—	1,196	—	—
Glasgow	12,442	1,501	1,418	67,225	23	8	2,474	—	—
Perth	19,765	4,046	*932	72,016	2,085	2,085	3,401	84	84
TOTAL for ENGLAND	208,127	7,077	5,244	849,036	3,822	2,561	18,602	387	129
TOTAL for SCOTLAND	72,148	22,608	*15,697	269,979	9,514	9,499	11,821	84	84
Total	280,275	29,685	*20,941	1,119,015	13,336	12,060	30,423	471	213

* Prices for 3,673 cattle in addition to the above were quoted from Edinburgh, and for 3,114 cattle from Perth, but without distinguishing the quality.

PRICES OF MEAT, CORN, AND DAIRY PRODUCE.

AVERAGE PRICES of DEAD MEAT, per Stone of 8 lbs., at the LONDON CENTRAL MEAT MARKET, during the Second Quarter and during the Months of June and July, 1897.

(Compiled from the prices quoted weekly in the "Meat Trades Journal.")

DESCRIPTION.	2ND QUARTER, 1897.	JUNE, 1897.	JULY, 1897.
BEEF :—	*s. d. s. d.*	*s. d. s. d.*	*s. d s. d.*
Scotch, short sides	4 3 to 4 7	4 5 to 4 8	4 5 to 4 8
,, long sides	3 11 ,, 4 2	4 0 ,, 4 2	4 1 ,, 4 4
English	3 10 ,, 4 1	3 11 ,, 4 1	3 9 ,, 3 11
Cows and Bulls	2 3 ,, 3 0	2 2 ,, 2 10	1 10 ,, 2 9
American, Birkenhead killed	3 4 ,, 3 7	3 1 ,, 3 6	3 1 ,, 3 4
,, Deptford killed	3 4 ,, 3 7	3 1 ,, 3 6	3 0 ,, 3 4
Argentine ,, ,,	2 9 ,, 3 2	2 6 ,, 2 11	1 11 ,, 2 8
American, Refrig. hind-qrs.	3 7 ,, 3 10	3 6 ,, 3 10	3 5 ,, 3 9
,, ,, fore-qrs.	2 3 ,, 2 6	1 10 ,, 2 2	1 10 ,, 2 2
Australian, Frozen hind-qrs.	2 6 ,, 2 9	2 7 ,, 2 9	2 4 ,, 2 7
,, ,, fore-qrs.	1 10 ,, 2 0	1 8 ,, 1 10	1 3 ,, 1 5
MUTTON :—			
Scotch, Prime	4 5 ,, 4 11	4 8 ,, 5 2	4 8 ,, 5 2
English, Prime	4 4 ,, 4 8	4 5 ,, 4 11	4 5 ,, 4 11
Ewes	3 4 ,, 3 9	3 1 ,, 3 8	3 0 ,, 3 6
Continental	4 1 ,, 4 5	4 4 ,, 4 7	3 11 ,, 4 5
River Plate, Town killed	3 5 ,, 3 8	3 4 ,, 3 7	2 7 ,, 3 0
New Zealand, Frozen	1 11 ,, 2 4	1 11 ,, 2 5	2 0 ,, 2 6
Australian, Frozen	1 10 ,, 1 11	1 10 ,, 1 11	1 8 ,, 1 9
River Plate, Frozen	1 10 ,, 1 11	1 10 ,, 1 11	1 8 ,, 1 10
LAMB :—			
English	5 5 ,, 6 5	4 11 ,, 5 11	4 9 ,, 5 6
New Zealand, Frozen	3 0 ,, 3 4	2 10 ,, 3 3	2 5 ,, 2 10
VEAL :—			
English	3 11 ,, 4 6	3 9 ,, 4 4	3 9 ,, 4 3
Foreign	3 0 ,, 3 9	3 0 ,, 3 8	3 1 ,, 3 7
PORK :—			
English, best	3 10 ,, 4 3	3 9 ,, 4 1	3 5 ,, 3 9
,, secondary / Foreign	3 3 ,, 3 9	3 1 ,, 3 7	2 9 ,, 3 3

AVERAGE WHOLESALE PRICES of CATTLE and SHEEP, per Stone of 8 lbs., sinking the offal, at the METROPOLITAN CATTLE MARKET, during the undermentioned Quarters of 1896 and 1897 :—

PERIOD.	CATTLE.			SHEEP.		
	Inferior.	Second.	First.	Inferior.	Second.	First.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
2nd Quarter, 1896	2 4	3 8	4 4	3 3	4 9	5 3
3rd Quarter ,,	2 4	3 9	4 4	3 2	4 8	5 4
4th Quarter ,,	2 4	3 9	4 6	3 2	4 10	5 5
1st Quarter, 1897	2 5	3 11	4 6	3 9	5 1	5 9
2nd Quarter ,,	2 5	4 0	4 7	3 10	4 11	5 8

AVERAGE WHOLESALE PRICES OF BEEF and MUTTON, per Stone of 8 lbs., by the Carcase, at LIVERPOOL and GLASGOW, during the undermentioned Quarters of 1896 and 1897 :—

PERIOD.	LIVERPOOL.*		GLASGOW.†	
	BEEF.	MUTTON.	BEEF.	MUTTON.
	s. d. . .	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*
2nd Quarter, 1896	2 0 to 3 4	3 0 to 5 0	2 4 to 3 6	3 8 to 4 10
3rd Quarter ,,	2 6 ,, 3 4	3 4 ,, 4 10	2 4 ,, 3 8	3 4 ,, 4 6
4th Quarter ,,	2 2 ,, 3 6	2 8 ,, 4 6	2 0 ,, 3 8	3 0 ,, 4 4
1st Quarter, 1897	2 8 ,, 3 6	3 4 ,, 5 2	2 8 ,, 4 0	4 0 ,, 5 0
2nd Quarter ,,	2 8 ,, 3 6	2 8 ,, 5 4	2 8 ,, 4 0	3 4 ,, 4 10

* Compiled from information furnished by the Medical Officer of Health, Liverpool. The prices quoted are for Carcases of Animals *slaughtered at the Liverpool Abattoir*, and do not apply to Imported Meat.

† Compiled from information furnished by the Principal of the Veterinary College, Glasgow.

BERLIN MARKET.

AVERAGE PRICES of CATTLE and SHEEP (First Quality Dead Weight) in the BERLIN CATTLE MARKET in the undermentioned Months of 1897.

MONTHS.	CATTLE. Per Cwt.	SHEEP. Per Cwt.
1897.	*s. d.*	*s. d.*
June - - - -	57 0 to 60 1	50 11 to 52 3
July - - - -	63 9 ,, 67 7	60 8 ,, 63 11
August - - - -	65 5 ,, 70 9	62 1 ,, 65 8

NOTE.—The above prices have been compiled from the weekly returns published in the *Deutsche Landwirthschaftliche Presse*. Since June a change has been made in these returns of prices: those for cattle now comprising only oxen instead of all kinds of cattle as formerly; those for sheep including lambs, which were formerly separated.

PARIS MARKET.

AVERAGE PRICES of CATTLE, SHEEP, and SWINE (Medium Quality) in the PARIS CATTLE MARKET in the undermentioned Months of 1897.

MONTHS.	OXEN. Per Cwt.	CALVES. Per Cwt.	SHEEP. Per Cwt.	PIGS. Per Cwt.
	LIVE WEIGHT.			
1897.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
June - - -	31 6	35 8	40 3	32 0
July - - -	31 1	36 0	39 5	35 6
August - - -	31 3	34 11	38 7	40 11
	DEAD WEIGHT.			
1897.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
June - - -	56 7	68 10	67 5	43 2
July - - -	54 11	64 8	65 6	48 10
August - - -	57 3	65 9	68 10	55 10

NOTE.—The above prices have been compiled from the weekly returns published in the *Journal d'Agriculture Pratique*.

CHICAGO.

PRICES of CATTLE at CHICAGO per Cwt. (Live Weight) in the under-mentioned Months of 1897.

Months.	Good Dressed Beef and Shipping Steers.	Export Cattle.	Extra Prime Cattle.
1897.	*s. d.* to *s. d.*	*s. d.* to *s. d.*	*s. d.* to *s. d.*
June - -	18 8 to 23 4	20 1 to 23 10	23 10 to 25 2
July - - -	18 8 ,, 22 8	19 10 ,, 23 4	23 4 ,, 24 3
August - -	19 10 ,, 25 2	19 10 ,, 25 5	23 10 ,, 26 2

Compiled from the Live Stock Reports issued by Messrs. Clay, Robinson, and Co., of the Union Stock Yards, Chicago, Illinois.

AVERAGE VALUES, per Cwt., of various Kinds of DEAD MEAT Imported into the United Kingdom from FOREIGN COUNTRIES and BRITISH POSSESSIONS in the under-mentioned Quarters of 1896 and 1897.

(*Computed from the Trade and Navigation Accounts.*)

PERIOD.	BEEF.		MUTTON.	PORK.		BACON.	HAMS.
	Fresh.	Salted.	Fresh.	Fresh.	Salted.		
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
2nd Quarter 1896 -	38 7	24 10	32 6	46 5	21 6	35 1	41 6
3rd Quarter ,, -	38 5	23 6	33 7	47 0	20 5	34 5	43 1
4th Quarter ,, -	36 11	23 8	31 3	45 7	22 10	35 6	45 7
1st Quarter 1897 -	39 4	25 9	27 4	44 11	23 4	33 5	41 9
2nd Quarter ,, -	40 1	23 10	32 0	43 11	20 10	35 11	43 5

AVERAGE PRICES of **British Corn** per Quarter of 8 imperial bushels,* computed from the Weekly Averages of Corn Returns from the 196 Returning Markets of ENGLAND AND WALES, pursuant to the Corn Returns Act, 1882, together with the QUANTITIES returned as sold at such Markets, in the under-noted periods of the Years 1897, 1896, and 1895.

QUARTER ENDED	PRICES.			QUANTITIES.		
	1897.	1896.	1895.	1897.	1896.	1895.
Wheat.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day -	29 7	25 8	20 1	619,679	448,047	652,874
Midsummer -	27 6	25 2	23 1	619,618	384,559	496,615
Michaelmas -	—	23 7	23 11	—	505,988	361,223
Christmas -	—	30 5	25 1	—	772,427	417,671
Barley.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day -	24 0	22 5	21 6	784,713	955,902	1,035,588
Midsummer -	21 4	21 4	20 3	78,488	92,739	79,936
Michaelmas -	—	21 0	21 3	—	165,722	141,985
Christmas -	—	27 1	24 10	—	2,177,499	2,169,067
Oats.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day -	16 4	13 9	13 9	194,193	259,565	250,838
Midsummer -	17 3	14 3	15 2	79,707	99,672	111,424
Michaelmas -	—	14 6	15 1	—	94,383	88,312
Christmas -	—	16 7	13 10	—	201,533	215,365

* Section 8 of the Corn Returns Act, 1882, provides that where returns of purchases of British Corn are made to the local inspector of Corn Returns in any other measure than the imperial bushel or by weight or by a weighed measure, that officer shall convert such returns into the imperial bushel, and in the case of weight or weighed measure the conversion is to be made at the rate of 60 imperial pounds for every bushel of wheat, 50 imperial pounds for every bushel of barley, and 39 imperial pounds for every bushel of oats.

AVERAGE PRICES of **British Corn**, per Quarter of 8 imperial bushels, computed from the Returns received under the Corn Returns Act, 1882, in each of the under-mentioned Weeks in 1897, and in the corresponding Weeks in 1896 and 1895.

Weeks ended *(in 1897)*.	**Wheat.**			**Barley.**			**Oats.**		
	1897.	1896.	1895.	1897.	1896.	1895.	1897.	1896.	1895.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Jan. 2 -	30 6	25 2	20 4	24 8	24 7	21 5	16 2	13 10	14 2
,, 9 -	31 1	25 4	20 8	25 5	23 11	21 3	16 3	13 9	13 9
,, 16 -	31 8	25 10	20 8	24 10	23 6	21 8	16 5	13 11	14 0
,, 23 -	31 7	26 1	20 9	25 5	23 7	21 11	16 6	13 10	13 10
,, 30 -	31 3	26 3	20 6	24 7	23 1	21 5	16 8	14 1	13 10
Feb. 6 -	30 7	26 4	19 11	24 10	22 5	21 8	16 7	14 0	13 6
,, 13 -	29 8	26 7	19 10	24 8	21 11	21 10	16 6	14 0	13 8
,, 20 -	28 11	26 3	19 10	23 9	21 10	22 2	16 5	13 9	13 9
,, 27 -	28 2	25 6	19 10	23 8	21 10	21 9	16 3	13 10	14 0
Mar. 6 -	28 3	25 4	19 9	23 0	21 5	21 6	16 3	13 8	13 9
,, 13 -	27 11	25 5	19 9	22 11	21 3	21 7	16 2	13 10	13 8
,, 20 -	27 11	25 1	20 0	22 8	21 1	20 10	16 2	13 9	13 10
,, 27 -	27 9	24 10	20 3	22 5	21 4	20 10	16 3	13 4	14 0
Apl. 3 -	27 10	24 7	20 4	22 3	21 10	20 11	16 3	13 3	14 5
,, 10 -	27 8	24 6	20 4	22 7	21 0	21 3	16 6	13 1	13 11
,, 17 -	27 0	24 11	20 6	23 0	23 6	21 2	16 3	14 0	14 5
,, 24 -	26 6	25 6	20 9	20 7	21 0	20 8	16 7	13 11	14 2
May 1 -	27 9	25 8	21 4	20 5	22 6	20 5	17 3	14 3	14 8
,, 8 -	28 4	25 7	22 4	21 5	21 0	20 8	16 11	14 4	15 3
,, 15 -	27 11	25 7	22 10	20 2	21 0	20 6	17 7	14 5	15 3
,, 22 -	28 1	25 6	23 5	19 10	21 8	20 1	17 9	14 6	15 9
,, 29 -	28 2	25 4	24 5	21 3	21 5	19 4	17 10	14 10	15 10
June 5 -	27 10	25 5	25 9	20 8	21 6	19 9	17 9	14 8	15 10
,, 12 -	27 4	25 1	26 2	22 8	19 3	19 4	17 11	14 9	15 11
,, 19 -	27 0	25 1	26 5	23 9	22 8	19 5	18 0	15 1	16 1
,, 26 -	27 0	24 10	26 1	19 9	19 5	20 3	18 6	14 10	16 7
July 3 -	27 1	24 9	25 7	18 10	16 2	19 9	18 7	15 0	16 4
,, 10 -	27 4	24 7	25 0	17 4	18 11	20 8	18 8	14 9	15 7
,, 17 -	27 7	24 2	24 4	17 6	18 3	18 6	18 3	15 4	16 6
,, 24 -	28 1	24 0	24 1	18 10	19 8	19 10	18 11	15 0	15 11
,, 31 -	28 10	23 8	24 2	17 10	19 7	18 2	19 0	14 10	15 9
Aug. 7 -	29 5	23 6	24 3	17 9	19 5	20 0	18 11	14 9	16 5
,, 14 -	29 8	22 11	24 6	19 0	21 1	19 3	17 4	14 6	16 1
,, 21 -	30 4	22 4	24 5	19 2	21 11	20 8	17 2	14 3	15 7
,, 28 -	31 8	22 5	23 10	22 5	21 10	23 5	17 1	13 7	14 5
Sept. 4 -	33 7	23 1	23 1	25 11	21 11	23 4	17 0	13 11	14 4
,, 11 -	33 1	23 9	22 10	27 4	23 4	23 11	17 3	14 1	13 8

AVERAGE VALUE per IMPERIAL QUARTER of WHEAT IMPORTED into the UNITED KINGDOM from the under-mentioned Foreign Countries and British Possessions in the First and Second Quarters of 1897.

COUNTRIES from which Exported.	Average Value per Imperial Quarter.	
	First Quarter, 1897.	Second Quarter. 1897.
	s. *d.*	*s.* *d.*
ARGENTINE REPUBLIC	30 2	28 6
CHILE	28 7	29 11
ROUMANIA	30 8	26 11
RUSSIA	30 2	28 5
TURKEY	29 7	28 4
U.S. OF AMERICA { Atlantic	30 9	28 11
U.S. OF AMERICA { Pacific	31 1	29 4
INDIA, BRITISH	29 11	—
NORTH AMERICA, BRITISH	30 1	29 7

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER in FRANCE and ENGLAND and WALES in the under-mentioned Months of 1897.

MONTH.	FRANCE.	ENGLAND.
WHEAT.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
June	37 11	27 3
July	38 8	27 9
August	44 0	30 3
BARLEY.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
June	21 8	21 8
July	21 5	18 0
August	21 11	19 7
OATS.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
June	18 0	18 0
July	17 11	18 8
August	18 2	17 7

Note.—The prices of French grain have been compiled from the official weekly averages published in the *Journal d'Agriculture Pratique*. The prices of British grain are official averages based on the weekly returns furnished under the Corn Returns Act, 1882.

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER at the under-mentioned Markets in the under-mentioned Months of 1897.

Month.	London.	Paris.	Breslau.
WHEAT.			
1897.	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d. s. d.
June	28 2	38 3	30 4 to 34 10
July	28 8	38 7	31 0 ,, 35 0
August	31 11	44 0	35 6 ,, 40 5
BARLEY.			
1897.	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d. s. d.
June	23 10	21 2	17 9 to 25 0
July	18 1	20 6	15 8 ,, 22 11
August	18 3	22 5	20 0 ,, 24 11
OATS.			
1897.	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d. s. d.
June	17 4	18 2	17 2 to 19 0
July	19 4	18 2	17 11 ,, 19 9
August	19 1	19 0	17 9 ,, 21 2

Note.—The London quotation represents the price of British corn as returned under the Corn Returns Act, 1882; the price of grain in Paris is the official average price of French wheat in that city; the quotations shown for Breslau represent the prices of grain of good merchantable quality.

III.—PRICES OF BUTTER, MARGARINE, AND CHEESE.

MEAN WHOLESALE PRICES of BUTTER, MARGARINE, and CHEESE, in the under-mentioned Months of 1897.

(Compiled from the *Grocer*.)

DESCRIPTION.	June.	July.	August.
	Per Cwt.	Per Cwt.	Per Cwt.
BUTTER:	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*
Cork, 1sts	79 0 —	78 0 —	85 0 —
,, 2nds	77 6 —	75 0 —	80 6 —
,, 3rds	76 0 —	73 0 —	72 0 —
,, 4ths	68 6 —	66 0 —	57 0 —
Friesland	80 6 to 84 6	80 0 to 84 0	90 6 to 93 0
Dutch Factories	77 0 ,, 84 6	80 0 ,, 85 0	92 6 ,, 95 6
French Baskets	91 0 ,, 96 0	90 0 ,, 97 0	93 0 ,, 102 0
,, Crocks and Firkins	85 0 ,, 89 0	86 0 ,, 88 0	85 0 ,, 89 6
,, 2nds and 3rds	71 0 ,, 81 0	73 0 ,, 81 0	74 0 ,, 82 6
Danish and Swedish	93 0 ,, 96 0	95 0 ,, 98 0	105 6 ,, 108 0
Finnish	78 0 ,, 85 0	75 0 ,, 88 0	85 6 ,, 97 0
Russian	74 0 ,, 80 0	73 0 ,, 81 0	80 0 ,, 92 0
Canadian and States	— ,, —	57 0 ,, 86 0	54 0 ,, 94 6
Fresh Rolls (Foreign) per doz.	9 0 ,, 12 6	9 0 ,, 13 0	9 0 ,, 13 0
MARGARINE:			
Margarine	24 0 ,, 50 0	24 0 ,, 50 0	24 6 ,, 51 6
Mixtures	46 0 ,, 70 0	46 0 ,, 70 0	46 6 ,, 72 6
CHEESE:			
Cheddar	65 0 ,, 84 0	55 0 ,, 65 0	55 0 ,, 67 6
Somerset	70 0 ,, 74 0	58 0 ,, 62 0	59 6 ,, 64 6
Cheshire	— ,, —	60 0 ,, 66 0	61 6 ,, 67 6
Wiltshire	56 0 ,, 61 0	56 0 ,, 62 0	57 6 ,, 63 0
Double Gloucester	55 0 ,, 59 0	54 0 ,, 59 0	50 6 ,, 58 0
Derby	— ,, —	51 0 ,, 52 6	47 6 ,, 51 0

WEEKLY PRICES (WHOLESALE) of VEGETABLES and FRUIT at COVENT GARDEN MARKET.

(Compiled from the *Gardeners' Chronicle*.)

	Week ending							
	5th August.		12th August.		19th August.		26th August.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
VEGETABLES—								
Artichokes, Globe, per dozen	2 0	—	2 0	—	2 0	—	2 0	—
Beans, Broad, per bushel	1 6	—	1 6	—	—	—	—	—
Beans, French, per bushel	2 0	—	2 0	—	1 6	—	1 6	—
Beans, Scarlet Runner, per bushel	2 6	—	2 6	—	1 6 to	2 0	1 6 to	2 0
Cucumbers, home-grown, select, per dozen	2 0 to	2 6	2 0 to	2 6	2 0 ,,	2 6	2 0 ,,	2 6
Cucumbers, seconds, per dozen	1 0 ,,	1 6	1 0 ,,	1 6	1 0 ,,	1 6	0 9 ,,	1 0
Garlic, per lb.	—	—	—	—	0 2	—	0 2	—
Mushrooms, Indoor, per lb.	0 6 ,,	1 0	0 6 ,,	1 0	0 6 ,,	0 9	0 6	—
Peas, per bushel	2 0 ,,	4 6	2 0 ,,	4 6	5 0	—	5 0 ,,	6 0
Salad, small, per dozen punnets	1 6	—	1 6	—	1 6	—	1 6	—
Shallots, per lb.	—	—	—	—	0 2	—	0 2	—
Tomatoes, selected, per doz. lbs.	4 0 ,,	4 6	4 0 ,,	4 6	4 6 ,,	5 0	4 0	—
Tomatoes, medium, per doz. lbs.	2 6 ,,	3 0	2 6 ,,	3 0	2 6 ,,	3 0	2 0 ,,	2 6
Tomatoes, seconds, per doz. lbs.	2 0	—	2 0 ,,	—	2 0	—	1 6 ,,	2 0
Tomatoes, Channel Islands, per lb.	—	—	—	—	0 3½	—	0 3	—
Vegetable Marrows, per dozen	1 0	—	1 0	—	1 0	—	1 0	—
FRUIT—								
Apples, Dessert, in variety, per bushel	8 0 ,,	9 0	8 0 ,,	9 0	8 0 ,,	9 0	8 0 ,,	10 0
Apples, Culinary, in variety, per bushel	4 0 ,,	6 0	4 0 ,,	6 0	3 6 ,,	5 0	3 6 ,,	5 0
Cherries, Morello, per lb. punnet	0 10 ,,	1 0	1 0 ,,	1 6	—	—	—	—
Currants, Red, per ½ bushel	4 0 ,,	5 0	—	—	—	—	—	—
Damsons, per ½ bushel	—	—	—	—	4 6 ,,	5 0	5 0 ,,	5 6
Figs, per dozen	1 0 ,,	2 0	1 0 ,,	2 0	2 0 ,,	3 0	1 0 ,,	2 0
Grapes, Gros Colmar, per lb.	1 6 ,,	2 0	1 6 ,,	2 0	1 6 ,,	2 0	1 6 ,,	2 0
Grapes, Gros Maroc, per lb.	—	—	—	—	1 6 ,,	2 0	1 0 ,,	1 6
Grapes, Alicantes, per lb.	1 3 ,,	1 9	1 3 ,,	1 9	1 3 ,,	1 6	1 0 ,,	1 3
Grapes, Hamburghs, selected, per lb.	1 6 ,,	3 0	1 6 ,,	3 0	1 6 ,,	2 0	1 0 ,,	1 6
Grapes, Hamburghs, second quality, per lb.	1 0	—	1 0	—	1 0	—	1 0	—
Grapes, Muscats, "Cannon Hall," per lb.	4 0 ,,	5 0	4 0 ,,	5 0	0 ,,	5 0	4 0 ,,	5 0
Grapes, Channel Islands, per lb.	0 10 ,,	1 0	0 10 ,,	1 0	0 7 ,,	0 9	0 7 ,,	0 9
Grapes, Muscats, selected, per lb.	2 6 ,,	3 0	2 6 ,,	3 0	2 0 ,,	2 6	2 0 ,,	2 6
Grapes, Muscats, second quality, per lb.	1 0 ,,	1 6	1 0 ,,	1 6	1 0 ,,	1 6	0 9 ,,	1 3
Melons, each	1 9 ,,	2 6	1 9 ,,	2 6	1 0 ,,	1 6	0 9 ,,	1 0
Nectarines, selected, per dozen	6 0 ,,	8 0	6 0 ,,	8 0	6 0 ,,	8 0	6 0 ,,	9 0
Nectarines, medium, per dozen	3 0 ,,	4 0	3 0 ,,	4 0	3 0 ,,	4 0	3 0 ,,	4 0
Nectarines, seconds, per dozen	1 6 ,,	2 0	1 6 ,,	2 0	1 6 ,,	2 0	1 6 ,,	2 0
Nuts, Cob, per lb.	—	—	—	—	0 4	—	0 3	—
Nuts, Filberts, per lb.	—	—	—	—	0 3	—	0 2	—
Peaches, selected, per dozen	6 0 ,,	8 0	6 0 ,,	8 0	6 0 ,,	8 0	6 0 ,,	8 0
Peaches, medium, per dozen	2 6 ,,	3 0	2 6 ,,	3 0	2 6 ,,	3 0	2 6 ,,	3 0
Peaches, seconds, per dozen	1 6 ,,	2 0	1 6 ,,	2 0	1 6 ,,	2 0	1 6 ,,	2 0
Pears, various, per bushel	—	—	—	—	4 0 ,,	6 0	4 0 ,,	10 0
Pears, small, per bushel	—	—	—	—	2 0 ,,	3 0	2 0 ,,	3 0
Pineapples, St. Michael, each	5 0 ,,	8 0	5 0 ,,	8 0	5 0 ,,	8 0	5 0 ,,	8 0
Plums, Greengage, per ½ bushel	—	—	—	—	8 0	—	8 0 ,,	9 0
Plums, Victorias, per ½ bushel	—	—	—	—	6 0 ,,	7 0	5 0 ,,	6 0
Plums, Ordinary, in variety, per ½ bushel	—	—	—	—	5 0 ,,	6 0	4 0 ,,	6 0

AVERAGE PRICES OF ENGLISH WOOL, per sack of 240 lbs., in the under-mentioned Months of 1897.

(Compiled from the *Economist.*)

DESCRIPTION.	JUNE.	JULY.	AUGUST.
	£ s. to £ s.	£ s. to £ s.	£ s. to £ s.
South Down	8 15 to 10 10	8 10 to 10 0	8 10 to 10 0
Half breds	8 15 ,, 9 17	8 10 ,, 9 15	8 10 ,, 9 15
Leicester	8 15 ,, 9 17	8 10 ,, 9 15	8 10 ,, 9 15
Kent Fleeces	8 10 ,, 9 15	8 0 ,, 9 10	8 0 ,, 9 10

DISEASES OF ANIMALS IN GREAT BRITAIN.

NUMBER of OUTBREAKS of **Pleuro-Pneumonia**, and of **Swine-Fever**, with the Number of CATTLE and SWINE Slaughtered by order of the Board of Agriculture, in Great Britain in each of the under-mentioned periods.

QUARTER ENDED	Pleuro-Pneumonia.			Swine-Fever.	
	OUTBREAKS Confirmed.	CATTLE found Diseased.	CATTLE Slaughtered as having been exposed to Infection.	OUTBREAKS Confirmed.	SWINE Slaughtered as Diseased, or as having been exposed to Infection.
	No.	*No.*	*No.*	*No.*	*No.*
June 1896	1	1	105	1,723	24,855
September 1896	—	—	—	1,104	19,329
December 1896	—	—	—	815	15,806
March 1897	2	14	450	785	13,544
June 1897	3	25	197	700	13,131

NUMBER of OUTBREAKS reported as having taken place, and Number of ANIMALS returned as having been ATTACKED by ANTHRAX, GLANDERS, and RABIES in Great Britain in each of the under-mentioned periods.

QUARTER ENDED	**Anthrax.**		**Glanders** (including **Farcy**).		**Rabies.**	
	OUTBREAKS REPORTED.	ANIMALS ATTACKED.	OUTBREAKS REPORTED.	ANIMALS ATTACKED.	CASES REPORTED.	
					DOGS.	OTHER ANIMALS.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
June 1896	106	214	177	303	127	11
September 1896	108	205	234	339	66	—
December 1896	118	219	213	331	45	1
March 1897	129	306	196	341	49	10
June 1897	109	201	230	393	38	—

DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of **Pleuro-Pneumonia** and of **Swine-Fever**, with the number of CATTLE and SWINE slaughtered by order of the Lord Lieutenant and Privy Council in Ireland, in each of the under-mentioned periods.

QUARTER ENDED	**Pleuro-Pneumonia.**			**Swine-Fever.**	
	OUTBREAKS Confirmed.	CATTLE found Diseased.	CATTLE Slaughtered as having been exposed to Infection.	OUTBREAKS Confirmed.	SWINE Slaughtered as Diseased or as having been exposed to Infection.
	No.	*No.*	*No.*	*No.*	*No.*
June 1896	—	—	—	241	1,614
September 1896	—	—	—	162	850
December 1896	—	—	—	60	2,794
March 1897	—	—	142	122	1,149
June 1897	—	—	—	136	1,571

NUMBER of OUTBREAKS reported as having taken place, and Number of ANIMALS returned as having been ATTACKED by ANTHRAX, GLANDERS, and RABIES in Ireland in each of the under-mentioned periods.

QUARTER ENDED	Anthrax.		Glanders (including Farcy).		Rabies.	
					CASES REPORTED.	
	OUTBREAKS REPORTED.	ANIMALS ATTACKED.	OUTBREAKS REPORTED.	ANIMALS ATTACKED.	DOGS.	OTHER ANIMALS.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
June 1896	1	1	—	—	150	86
Sept. 1896	—	—	3	4	114	50
Dec. 1896	—	—	—	1	74	29
March 1897	—	—	—	—	118	19
June 1897	1	1	1	2	139	41

PRELIMINARY STATEMENT compiled from the Returns collected on the 4th June, 1897, showing the ACREAGE under HOPS in each COUNTY OF ENGLAND in which Hops were grown, with a COMPARATIVE STATEMENT for the years 1896, 1895, and 1894.

COUNTIES.	1897.	1896.	1895.	1894.
	Acres.	Acres.	Acres.	Acres.
BERKS	—	4	—	11
GLOUCESTER	40	49	38	39
HANTS	2,306	2,494	2,875	2,911
HEREFORD	6,542	6,895	7,553	7,525
KENT	31,661	33,300	35,018	35,520
MONMOUTH	2	—	—	—
SALOP	129	140	150	140
SUFFOLK	2	4	10	17
SURREY	1,416	1,623	1,783	1,935
SUSSEX	5,174	5,908	7,489	7,589
WORCESTER	3,591	3,800	4,024	3,848
Total	50,863	54,217	58,940	59,535

POST OFFICE SAVINGS BANKS, WITH GOVERNMENT SECURITY.

Advantages Offered for Life Insurance.

Life Insurances from £5 to £100 can be granted to persons between fourteen and sixty-five years of age. Children between eight and fourteen years of age can be insured for £5.

Government Security.—Persons insured have direct Government security.

Postal Forms can be obtained at any Post Office Savings Bank, where the charges can also be ascertained.

Evidence of Age.—A statement of age is sufficient if the Controller of the Savings Bank Department can verify it from the records of the Registrar-General, London, and thus the cost of a certificate of birth is saved. A simple form for the purpose can be obtained at any Post Office Savings Bank.

Medical Certificates can be dispensed with for Insurances up to £25 inclusive.

Premiums are payable by transfers from Savings Bank deposit accounts, and deposits can be made for the purpose at any Post Office Savings Bank. When the balance in the account is insufficient, the depositor will be informed accordingly in time to make a deposit. By means of the Penny Stamp Slips the provision can be made in sums of one penny at a time.

Friendly Societies.—Members can pay their premiums through their Society, if the Society is willing to undertake the collection.

Residence Abroad.—Permission is granted to persons over thirty years of age, who have been insured five years, to

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Number.	Title.
Leaflet No. 1	Mites on Currant and Nut Trees.
,, ,, 2	Vine and Raspberry Weevils.
,, ,, 3	The Turnip Fly or Flea.
,, ,, 4	Caterpillars on Fruit Trees.
,, ,, 5	The Mangel Wurzel Fly.
,, ,, 6	The Field Vole.
,, ,, 7	Autumn Catch Crops and Fodder Supply.
,, ,, 8	Farmers and Assessments to Local Rates.
,, ,, 9	Ensilage.
,, ,, 10	Wireworms.
,, ,, 11	The Daddy Longlegs.
,, ,, 12	The Gooseberry Saw-Fly.
,, ,, 13	Acorn Poisoning.
,, ,, 14	The Raspberry Moth.
,, ,, 15	The Apple Blossom Weevil.
,, ,, 16	The Apple Sucker.
,, ,, 17	Preservation of Commons.
,, ,, 18	Fertilisers and Feeding Stuffs Act, 1893.
,, ,, 19	Pea and Bean Weevil.
,, ,, 20	The Magpie Moth.
,, ,, 21	The Warble Fly.
,, ,, 22	The Diamond Back Moth.
,, ,, 23	Potato Disease.
,, ,, 24	The Ribbon Footed Corn-Fly.
,, ,, 25	The Cockchafer.
,, ,, 26	Farmers and the Income Tax.
,, ,, 27	Remission of Tithe Rentcharge.
,, ,, 28	Anthrax.
,, ,, 29	Swine Fever.
,, ,, 30	The Codlin Moth.
,, ,, 31	The Onion Fly.
,, ,, 32	Foul Brood or Bee Pest.
,, ,, 33	Surface Caterpillars.
,, ,, 34	The Woolly Aphis or American Blight
,, ,, 35	The Celery Fly.
,, ,, 36	Cultivation of Osiers.
,, ,, 37	Rabies.
,, ,, 38	The Carrot Fly.
,, ,, 39	Assessments to Land Tax.
,, ,, 40	The Kestrel or Windhover.
,, ,, 41	The Sparrow-hawk.
,, ,, 42	The Short-eared Owl.
,, ,, 43	Titmice.
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The Journal

OF THE

BOARD OF AGRICULTURE

DECEMBER, 1897.

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THE JOURNAL
OF THE
BOARD OF AGRICULTURE.

Vol. IV. No. 3. DECEMBER, 1897.

THE GRAIN HARVEST OF 1897.

The Board of Agriculture issued at the beginning of December the annual preliminary statement showing the estimated total yield of the wheat, barley, and oat crops of Great Britain for the current year. The returns published in August last indicated that the wheat crop of 1897 was grown on a surface greater by 11½ per cent. than the wheat area of 1896. The official estimates of the yield now available show, however, the results of the harvest to have been slightly under a ten years' average, so that the total outturn is less by some 267,000 quarters than that of the previous year. Stated in bushels, the wheat harvests of the past two years are contrasted in the following table, in which the last column shows the average of the decennial period 1887-96 :—

Wheat.	Estimated Total Produce.		Estimated Yield per Acre.		Average of the Ten Years 1887-96.
	1897.	1896.	1897.	1896.	
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
England - - -	51,697,650	54,523,269	28·98	33·88	29·52
Wales - - - -	1,332,192	1,078,090	24 76	22·95	23·35
Scotland - - -	1,883,388	1,451,593	37·83	38·47	35·64
Great Britain - -	54,913,230	57,052,952	29·09	33·68	29·49

A comparison with the harvest of 1895 would give much more satisfactory results, for in that year the yield of wheat was estimated at only 26·23 bushels per acre, and the total produce from the small area of 1,417,000 acres then under the crop in Great Britain stood at no more than 37,176,000 bushels, or 4,647,000 quarters against the 6,864,000 quarters of this season.

The county figures of the yield of the wheat crop of 1897 will in due course appear in the completed Agricultural Returns, but it may be stated here, in advance of these, that an examination of the results in the groups of contiguous counties treated as possessing certain common agricultural features, which have been frequently quoted in connection with Produce Statistics, has shown that the highest estimated yield for any one of the eight sub-divisions of England was returned from the group formed by the counties of Norfolk, Lincoln, and the East Riding of York, where 31·37 bushels per acre was obtained; while the lowest yield, 26·26 bushels, was returned from the extreme south-western group of Somerset, Dorset, Devon and Cornwall. In the group of eastern counties lying south of Norfolk and north of the Thames, which contains nearly one-fourth of the English wheat acreage, the estimated yield per acre was 28·23 bushels.

This figure was scarcely exceeded by the group of south-eastern counties lying south of the Thames where the average stood at 28·54 bushels. In the group of Midland counties stretching northward from Berkshire to the Lincolnshire boundary the average yield is given as just below 28 bushels, the west midland group showing about a bushel more per acre, or nearly 29 bushels, a figure which was exceeded in the northern group.

The yield of the barley crop of 1897 is given in the estimate recently published as having been exactly equivalent to the average of the ten years 1887-96, or 32·82 bushels per acre; the English crop alone was slightly under the average, but the Welsh crop was nearly a bushel, and the Scotch crop rather more than a bushel, in excess of the decennial estimates. Compared with 1896 the acreage under barley in

Great Britain this season was reduced by 3·3 per cent., and the average yield was smaller by nearly 1 bushel per acre, so that the total production was nearly 500,000 quarters short of that of last year, as the subjoined table shows.

BARLEY.	Estimated Total Produce.		Estimated Yield per Acre.		Average of the Ten Years, 1887-96.
	1897.	1896.	1897.	1896.	
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
England - - - -	55,148,526	59,843,547	32·48	33·64	32·81
Wales - - - - -	3,116,438	2,823,170	29·86	26·21	28·89
Scotland - - - -	8,538,915	8,108,059	36·63	37·14	35·51
Great Britain -	66,803,879	70,774,776	32·82	33·63	32·82

The largest average yield of barley in any of the groups of English counties referred to above was reported from Yorkshire (West and North Ridings) Durham, and Northumberland, where a mean of 35·72 bushels was estimated; while the smallest yield was returned, as in the case of wheat, from the four south-western counties, for which the average was only 28·49 bushels.

The average yield of oats in Great Britain in 1897 was, according to the preliminary estimate, 38·49 bushels per acre. This is a little over a ten years' average, and it is nearly 1¾ bushels per acre better than the poor oat crop of 1896, as will be seen from the table below.

OATS.	Estimated Total Produce.		Estimated Yield per Acre.		Average of the Ten Years 1887-96.
	1897.	1896.	1897.	1896.	
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels*
England - - - -	73,604,275	69,402,150	40·26	37·60	40·12
Wales - - - - -	7,765,962	7,179,786	32·56	29·71	32·26
Scotland - - - -	35,442,224	37,433,971	36·60	37·13	36·12
Great Britain -	116,812,461	114,015,907	38·49	36·83	38·13

In the case of oats the fluctuations of the estimated average yield per acre in the several divisions of England ranged from 45·75 bushels in the group of counties formed by Norfolk, Lincoln, and the East Riding of Yorkshire, to only 35·25 bushels in the four south-western counties, which stand lower than any other sub-division of the country as regards the grain harvest of 1897.

The estimates for each of the groups of English counties above referred to stand as under:—

Divisions of England.	Estimated yield per acre in 1897.		
	Wheat.	Barley.	Oats.
	Bushels.	*Bushels.*	*Bushels.*
I. (*a.*) Eastern Counties, viz.:—Bedford, Hunts, Cambridge, Suffolk, Essex, Herts, Middlesex, London	28·23	32·06	43·56
(*b.*) North-Eastern Counties, viz.:—Norfolk, Lincoln, York (East Riding)	31·37	33·87	45·75
II. (*a.*) South-Eastern Counties, viz.:—Kent, Surrey, Sussex, Berks, Hants	28·54	32·24	43·44
(*b.*) East-Midland Counties, viz.:—Notts, Leicester, Rutland, Northampton, Bucks, Oxford, Warwick	27·98	30·64	37·44
III. (*a.*) West-Midland Counties, viz.:—Salop, Worcester, Gloucester, Wilts, Monmouth, Hereford	28·98	30·88	39·95
(*b.*) South-Western Counties, viz.:—Somerset, Dorset, Devon, Cornwall	26·26	28·49	35·25
IV. (*a.*) Northern Counties, viz.:—Northumberland, Durham, York (North Riding, York (West Riding)	29·68	35·72	38·49
(*b.*) North-Western Counties, viz.:—Cumberland, Westmorland, Lancashire, Cheshire, Derby, Stafford	30·62	32·64	37·87

CONSUMPTION OF FOOD PRODUCTS IN THE UNITED KINGDOM.

A noteworthy feature in connection with the food supplies of the United Kingdom during the present generation has been the increased consumption of animal food which has accompanied the development of the trade in frozen and chilled meat. Improvements in the processes of preserving and transporting perishable produce have brought within the reach of the industrial population large consignments of fresh beef and mutton from the Antipodes and from trans-atlantic countries, with the result that the proportion of meat in the food of the people has been sensibly increased. It might be supposed that this change would be followed by a decreased consumption of other things, but the absence of satisfactory data of the production of some varieties of food, *e.g.*, butter and cheese, renders it difficult to make any very precise deductions as to the full extent of the modifications which may have taken place in the composition of the dietary of the population. Statistics are, however, available of the production and importation of some of the principal articles of food, and from these it is possible to estimate the average quantities of these products entering into consumption annually in this country. It is here proposed to refer to the results brought out by estimates of this kind, which may throw some light on the changes that have occurred in the relative consumption of meat and other food-stuffs in the United Kingdom in the past twenty years.

Statements showing the estimated supply of meat available for food during that interval will be found in the Report on the Agricultural Returns for 1896, and in the Final Report of the Royal Commission on Agriculture. In the former the results are shown in yearly averages

for quinquennial periods, while in the latter the averages are taken for groups of three years. An explanation of the methods of calculation by which these estimates are obtained is published in the Minutes of Evidence of the Select Committee on the Marking of Foreign Meat; briefly stated, the process consists in converting into meat, upon the basis of the ascertained dressed-carcase weight of each class of stock, the number of home-bred animals slaughtered annually for food, as well as the live animals imported, and adding thereto the imports of dead meat. From these statements it appears that the quantity of meat consumed annually per head of the population has risen in twenty years from about 112 lbs. to 122 lbs. It is to be remarked that this increased supply has been derived mainly from foreign sources, and as the bulk of it is cheaper than the home produce, it may be inferred that the increased consumption has been largely due to the fact that meat now figures to a larger extent in the dietary of those classes of the population with whom cheapness is a consideration. In this connection it is hardly necessary to observe that the statement that the consumption of meat has risen from 112 lbs. to 122 lbs. per head does not mean that every individual of the population consumes that amount of food. In certain sections of the community the amount eaten annually would no doubt work out to a good deal more than 122 lbs. per head, while among some of the poorer classes of the people meat must still be more or less a luxury, though this is probably less the case than formerly, and the quantity consumed by them would represent considerably less than the ration quoted above.* Still it is not assuming too much to infer that meat appears on the table of the poor more frequently to-day than twenty years ago.

It would seem probable that an increase in the consumption of meat, consequent upon the provision of a new and abundant supply of cheap mutton and beef, would manifest itself, at least in some degree, in a lessened dependence upon what is gene-

* It may be noted that the ration of 122 lbs. per head includes beef, mutton, pork, bacon, and hams, and that it amounts approximately to 5·3 oz. per diem of raw meat.

rally considered to be the staple food of the population. The extent to which the demand for bread has been affected may be gauged approximately by an examination of the evidence relating to the consumption of wheat. Official statistics of the home production of this cereal were first published in 1884, but for the earlier years recourse may be had to the estimates issued by Sir John Lawes, based upon the results obtained in the Rothamsted experiments. The quantity of wheat available for consumption in a given year may be ascertained by two processes. The method usually followed is to add to the home production, after deducting something for seed, the imports less the exports of the cereal year. Another process is to add to the net imports of the calendar year one-third of the crop of that year, and two-thirds of the crop of the previous year, after making an allowance for seed. The results obtained by these two calculations do not differ to any material extent, but reference will be made to both for the purposes of this article. A sufficiently correct impression of the changes in the supplies of wheat, and of other articles of diet, in the past twenty years will be obtained by comparing the average annual supply for the three years 1876-78 with that for 1894-96, noting when necessary any marked fluctuations in the interval which may modify the conclusions to be drawn from the figures for the periods mentioned.

In the three calendar years 1876-78 the average annual quantity of wheat available for consumption in the United Kingdom represented 5·50 bushels per head of the population, whereas in 1894-96 it amounted to 5·99 bushels. Similar estimates for periods of three cereal years ending with 1878 and 1896 show the supply to have been 5·57 and 5·96 bushels respectively for each individual. These figures indicate, *primâ facie*, that the consumption of wheat has slightly increased, and the impression they convey is confirmed by an examination of the results of similar calculations for earlier and intervening years. Six bushels per head is usually held to be the approximate average annual consumption of wheat for human food; but judging from the estimates published by Sir John Lawes and other authorities, the actual yearly

supply per head did not reach six bushels on more than eight occasions between 1852 and 1890, the normal ration being apparently from a half to a quarter of a bushel short of that allowance. In each of the past five years, however, the supply has exceeded five and three-quarter bushels per head. Thus, either the supply has been in excess of the actual demand, or more wheat is consumed now than was formerly the case, and in this connection it should be observed that it is believed that the low price of the cereal in question has induced farmers to use it to some extent for stock-feeding. But whatever may be the true explanation of the larger supplies, it is difficult to find in the figures quoted above evidence that the inhabitants of this country individually eat less bread than they did twenty years ago.

Potatoes rank next in importance as an article of food. The earliest official records of the production of potatoes in the United Kingdom are for the year 1884. In order to ascertain what changes have occurred in the consumption of this vegetable, the average annual supply available for food has been calculated for periods of three years since 1884, after making an allowance of $12\frac{1}{2}$ cwts. per acre for seed. The results show that the supply has dropped from approximately 347 lbs. to 305 lbs. per head of the people. The decrease in the population of Ireland, where potatoes are the principal food of the poor, must not be overlooked, but the diminution in the consumption is greater than would be explained by the loss of consuming power consequent upon Irish emigration. Moreover, an examination of the statistics of the area under potatoes for the past twenty years shows that while in Ireland there has been an absolute decline of nearly 100,000 acres, in Great Britain the acreage has, if anything, also declined, or at least remained stationary, and the imports per head have decreased by about 50 per cent. since 1883. It would appear, therefore, that the importance of this vegetable in the average dietary of the population has diminished.

Oatmeal was formerly an important article of food among the labouring classes of Scotland and Ireland, but this has apparently been to some extent displaced in recent years by

white bread and tea. Frequent references to this movement will be found in the Reports of the Assistant-Commissioners to the Royal Commission on Labour, and the evidence collected by these authorities is supported by the fact already mentioned that the average supplies of wheat per head have not only been maintained, but have tended to increase. It may also be observed that the statistics of the quantities of tea retained for home consumption in the United Kingdom have for many years shown a steady growth. The quantity retained annually for home consumption in the United Kingdom now yields an allowance of $5\frac{3}{4}$ lbs. for each inhabitant, as compared with $4\frac{1}{2}$ lbs. twenty years ago. In the same interval there has been a large augmentation in the annual supplies of sugar, which now represent a ration of 85 lbs. per head. Another product showing a decline is rice, and although it has never been a prominent article of diet in this country, a marked diminution in the demand for that article is worthy of notice. The quantity retained for consumption annually has fallen in twenty years from about 11 lbs. to 7 lbs. per head of the population, the reduction in the supplies having apparently begun about twelve years ago.

Among other food products which have to be considered, cheese, butter, and milk are, perhaps, the more important. As regards manufactured dairy produce, estimates have been made by various authorities of the extent to which the production of butter and cheese is caried on in this country, but these are necessarily of a conjectural character. There is, however, less difficulty in estimating the home production of milk, and it is possible to ascertain with tolerable accuracy the quantity of milk imported in the form of butter and cheese, so that in this way a rough calculation can be made of the volume of milk consumed annually in all forms. The large importation of margarine must also be taken into account, and for the purposes of this paper a given weight of that article has been regarded as equivalent to a similar weight of butter. In an article published in the June number of this Journal it was assumed that the yield of milk from an average home-bred cow amounted

to about 400 gallons per annum. On this basis, the average home production of milk in the United Kingdom represented a supply of 45 gallons per head of the population in 1876-78, and of just over 40 gallons in 1894-96; for the same periods the imports of cheese, butter, and margarine represented in milk 20 gallons and 35 gallons per head respectively; the supply available from all sources would therefore seem to have risen from about 65 gallons to 75 gallons per head.

It would be interesting to discover what proportion of this supply is made up of cheese and butter respectively, but unfortunately no reliable statistics exist as to the extent to which the milk produced in this country is devoted to the manufacture of those articles. It appears, however, that the imports of cheese have increased by about one pound per head in twenty years, the annual foreign supply at present being about six pounds, whereas those of butter and margarine have risen in the same interval from about five pounds to over eleven pounds per head. On the other hand, the home production of milk has apparently declined relatively to the population,* and if this is really the case the output of both cheese and butter from British and Irish dairies cannot have been increased without curtailing the market supply of raw milk. The remarkable expansion in the imports of butter and margarine is believed, however, to have led to a contraction in the home manufacture of butter, and thus set free a certain quantity of milk; and allowance must also be made for the growing consumption of condensed milk, the net import of which was 376,000 cwts. last year. But there can be little doubt that any reduction in the output of butter has been more than counterbalanced by the growth of the imports. As regards cheese the evidence of a change is not so clear. Slightly more foreign cheese is consumed now than formerly by each individual, but it has been held that the demand for cheese has decreased, and if this is the case, the

* In paragraph 269 of the Report of the Royal Commission on Agriculture, it is stated that the production of milk relatively to the population must have declined, unless it be assumed that there has been a material improvement in the milk-yielding qualities of the cows in this country.

manufacture of the article in this country must have declined relatively to the population.*

The consumption of eggs and fish should perhaps be briefly noticed. In the case of eggs we are again met with the difficulty that, except for Ireland, no statistics exist which will enable us to determine the home production. One authority has estimated that the consumption of eggs has been doubled during the past fifteen years, and the import statistics show that the number of foreign eggs retained annually for food in the United Kingdom now amounts to forty per head of the population, as compared with twenty-two about twenty years ago. But in the absence of complete statistics it can only be assumed that more eggs are consumed per inhabitant now than formerly, without attempting to appreciate the extent of the increased demand.

Complete details of the quantity of fish (exclusive of salmon) returned as landed on the coasts of the United Kingdom are available for each year since 1888. In the nine years the quantity landed, excluding shell fish, has increased from 11,651,000 cwts. to 14,500,000 cwts., or from 35 lbs. to 41 lbs. per head of the population. These figures represent something like the actual consumption, as the imports and exports in an average year nearly balance each other.

In conclusion it should be repeated that the materials for an inquiry into the question of food consumption do not permit any very definite conclusions to be arrived at as to the full extent of the relative changes in the proportions of the various articles included in the dietary of the nation. Nevertheless, one fact which stands out clearly from the information available as to the consumption of agricultural products in the present generation is that meat is becoming more and more important as an article of food in this country; and it may be inferred that this development is due largely

* In the Final Report of the Royal Commission on Agriculture, paragraph 472, it is stated that the great competition of foreign butter and cheese has stimulated the development of the milk trade, because farmers have found it more profitable to sell milk in its raw state, and, in addition, much less trouble and risk are involved. See also para. 471 as to the diminution of the demand for cheese, owing to the abundance of cheap meat.

to those circumstances, referred to above, which have brought within the reach of the industrial population an abundant supply of cheap meat from colonial and foreign sources. In other words, the larger consumption of meat per head of the population really means that the article has become less of a luxury to the poorer classes of the community than was formerly the case. So far as can be judged from the statistics quoted above as to the supplies of wheat, there is no evidence of a decreased consumption of bread; on the contrary, it would almost appear that the tendency has been in the opposite direction. As regards other farinaceous foods, there has been apparently some displacement of potatoes; and the information collected by the Royal Commission on Labour shows that oatmeal is giving way to white bread and tea. The position of cheese cannot be clearly ascertained, but, as has already been noted, it has been held that the demand for cheese of home production has declined with the introduction of cheap meat. Butter, including margarine, on the other hand, appears to be consumed to a greater extent now than twenty years ago.

On the whole, the inference to which an examination of all the evidence may point is not so much that the increased consumption of meat has been accompanied by a smaller demand for other things, but that the people generally are better fed.

THE EXPORTS OF BRITISH AND IRISH AGRICULTURAL PRODUCE.

The great and increasing volume of the imports of food products is so important a feature of the economic conditions existing in this country that the dimensions of our exports of these articles may appear in comparison to be almost insignificant. Still, relatively small as is the outward current of trade in British and Irish agricultural produce, it presents some features of interest. For the past three years the average annual value of the total exports of articles declared to be of home production has amounted to, roughly, £5,000,000, exclusive of the exports of biscuits and bread. The various products which contributed to this total may be grouped into the several classes: live stock; meat; other animal products; grain and flour; seeds and vegetables; provisions and food unenumerated; and other products. It should, however, be observed that although the articles included in these groups are declared to be British and Irish agricultural produce, it is possible that some portion of them may not come strictly within this definition. Subject to this qualification, the aggregate value of the exports included in each class is shown below:—

——	1894.	1895.	1896.
	£	£	£
Live stock	632,372	756,011	903,690
Meat	360,493	397,539	413,898
Other animal products	2,087,013	2,596,973	2,199,984
Cereals and cereal products	416,574	393,007	417,672
Vegetables, hops, and seeds	591,442	355,727	335,937
Provisions and raw materials for food	685,022	798,225	943,854
Other products	208,561	199,598	122,642

In the case of live stock, horses constitute the largest single item, the exports of these animals having amounted in value to an average of over £550,000 annually in the

three years, as compared with £130,000 for cattle, and £69,000 for sheep. The greater part of the half million sterling for horses is credited to geldings, in which there is a considerable trade with Belgium and the Netherlands, both these countries purchasing large numbers annually at about £10 each, while France has taken between 2,000 and 3,000 superior geldings yearly, valued at £50 to £55 each, for riding and driving. Germany has recently been our chief customer for stallions, and Brtish South Africa has ranked second, but the average annual value of our exports of entire home-bred horses was only £61,000 in the three years, or about £125 per head, while an average exportation of 3,964 mares is declared to have realised £160,000 yearly—all but a tenth of this sum being accounted for by consignments to the Continent, mainly to Belgium and France, though the purchases by Germany are increasing. Our exports of cattle are not confined, as is sometimes supposed, to breeding stock; there is a steady trade in beef cattle with the Channel Islands, whither we send from 2,000 to 3,000 beasts yearly, and Belgium also has been a purchaser of beeves from this country. For pedigree stock, Argentina is our principal customer; her purchases of cattle amounted in 1896 to over £60,000 for 989 animals, while in the same year she took 7,206 sheep of the aggregate value of £88,867.

Of home-grown meats there was an average exportation in 1894-96 of about 112,000 cwts., the consignments being nearly equally divided between British possessions and foreign countries. France and Brazil were the more important of the foreign consignees. The major part of the shipments of meat consists of bacon and hams, but fresh mutton and beef are sent to the Channel Islands.

Under "other animal products" in the above table are included butter, cheese, margarine, condensed milk, wool, skins, hides and animal fat. The average annual value of the exports of British and Irish butter in the three years under consideration was £92,000, over one-third of this sum being accounted for by consignments to Portugal, while Gibraltar, Malta, and British South Africa were debited with about half the remainder. Cheese is not exported to the same extent as

butter, the annual shipments being under half the value of those of the last-named article. India is the principal consignee. British margarine has been sold abroad in increasing quantities in recent years, the value of the consignments having risen from £23,000 to £34,000 between 1894 and 1896. South Africa took over two-thirds of the total exports of this product, and there was a small sale to Denmark. On the other hand, the shipments of oleo-margarine from this country are on a smaller scale than formerly, possibly owing to the extended home-manufacture of margarine. The quantity sent abroad in 1896 was 23,000 cwts. of the value of £29,000, as compared with 38,000 cwts. of the value of £76,000 in 1894; the Netherlands is the chief outlet for this trade. Condensed milk of British make is growing in importance as an article of export, the demand coming principally from South Africa; in the three years 1894-1896 the quantities shipped rose from 71,000 cwts., valued at £148,000, to 112,000 cwts. of the value of £225,000.

Among the remaining animal products, raw sheep and lambs' wool next calls for consideration. The cargoes of this staple shipped from the ports of the United Kingdom have ranged from 13,000,000 lbs. to over 21,500,000 lbs. annually during the past few years. For the triennial period 1894-96 the average yearly exportation amounted to 17,000,000 lbs., of the value of £700,000, half of which was debited to the United States, while Germany, Russia, France, and the Netherlands accounted for most of the remainder. The United States is also our chief customer for sheep's skins, taking all but a few hundred thousand of our annual exports, which amounted in the past three years to an average of nearly 4,000,000 skins, of the value of £228,000. In the same period the average exports of grease, tallow and animal fat exceeded half-a-million hundredweights, of the value of £570,000; the bulk of these bye-products is shipped to the Continent, the Netherlands being the largest single purchaser. Of raw hides the shipments have annually run to between 120,000 and 130,000 cwts., but in 1895, 217,000 cwts. were sent abroad owing to an exceptional demand from the United States, which took over 101,000 cwts. in that year. Ordinarily this

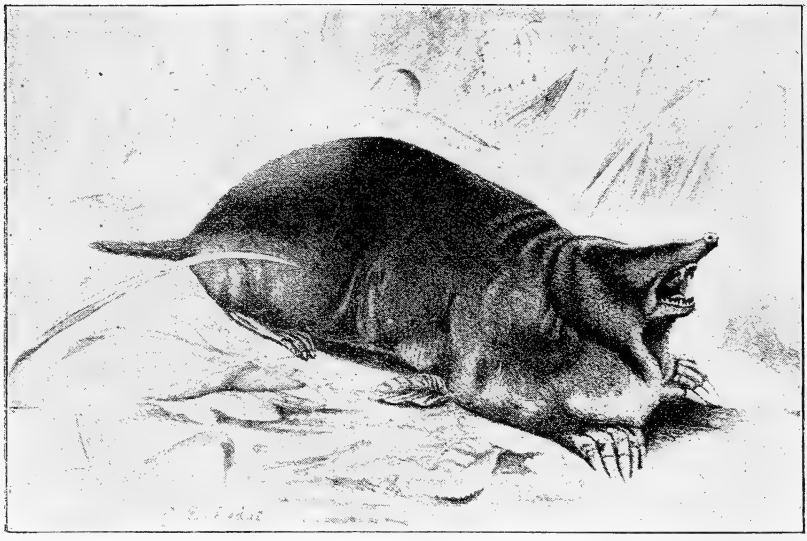
trade is mainly with France and Germany, and its aggregate annual value has not exceeded £200,000, except in 1895, when it amounted to £356,000.

In the class of cereals and cereal products the principal articles of export are flour and malt. Of the former about 280,000 cwts. are exported annually, mainly to the Channel Islands, Malta, and Gibraltar. The Netherlands, Australasia, and British South Africa are our chief customers for malt, of which the total exports amounted in 1894-96 to an average of 87,000 cwts., of the value of £164,000. The export trade in home-grown wheat, barley, oats, beans, and peas is of very small dimensions, the aggregate annual value of the shipments of these articles having only once exceeded £100,000 in the past three years. British Possessions take the bulk of the consignments, but France and Belgium were debited with over 10,000 cwts. of wheat, and Denmark with from 6,000 to 7,000 cwts. of barley in each year. The trade in oats is subject to great fluctuations; last year the exports amounted to 94,227 cwts., of which about 75 per cent. went to the Channel Islands; in 1895 there was, however, a total exportation of 233,000 cwts., and of 251,000 cwts. in 1894, due to large, and apparently exceptional, demands from Italy and France respectively.

British potatoes were formerly exported in considerable quantities to the United States, but since the introduction of the McKinley tariff this trade has almost disappeared. As late as 1894 the transatlantic shipments from this country amounted to nearly 850,000 cwts. of the value of £167,000 but last year they had dropped to 1,000 cwts., valued at £143 In 1896 the export of potatoes weighed in the aggregate 341,000 cwts., of which Spain and the Canaries took nearly 43,000 cwts., while the bulk of the remainder went to British Possessions, including the Channel Islands. There is a small exportation of English hops, mainly to British Possessions, but the usual extent of this trade is only about 10,000 cwts. yearly. Seeds are shipped in large quantities to the Continent and Australasia, the average annual outward consignments in 1894-96 amounted to over twelve thousand tons, of the value of £275,000.

Provisions and raw materials for food unenumerated include ships' stores, game, lard, nuts, pollards, patent barley, hay, sausage skins, preserves, and other articles. These products were exported to the total value of about £800,000 annually in the past three years; more than half of this sum was for goods sent to British Possessions; France is the largest single purchaser among foreign countries.

Of the "other products" in the table dressed and undressed flax and hemp, which are exported chiefly to the United States, constitute by far the largest item. No allowance has been made for the large export trade, valued at over £550,000 annually, in biscuits and bread, which contain an unascertainable proportion of flour, etc., of home production.



THE MOLE (*Talpa Europœa, Linn.*).

By J. E. Harting, F.L.S., F.Z.S.

Although seldom seen above ground, and more rarely heard, few of the smaller British mammals come more prominently under notice of agriculturists than the Mole. There is scarcely any part of the British Islands where the soil is at all favourable to its working, from which it is absent; though naturally as we travel northwards into counties where rocks and boulders abound we gradually lose trace of it, or at least find it only in fertile valleys lying between the hills.

In the second edition of his "British Quadrupeds," published in 1874, the late Thomas Bell remarked that the Mole is not found in the north of Scotland nor in the islands of Orkney and Shetland. This view now requires some modification, for the late Edward Alston in his Notes on the Fauna of Scotland, published in 1880, pointed out that the range of this little animal had been considerably extended of late years, and that it was to be found in places suited to its

habits throughout the mainland to Sutherlandshire and Caithness. In Sutherland, when the old statistical account of the parishes was published in 1843, it was very rare in the parish of Durness, and only to be met with on the western side of Loch Hope. In Assynt it is now commonly to be found in low-lying ground and valleys where the surface is cultivated. In some of the pastures numbers of old mole-hills may be seen overgrown with grass, making the whole surface of the fields rough and uneven. In Sutherlandshire the Mole is never found at any considerable elevation, a fact which must be attributed to the nature of the soil, or rather to the want of soil on the hill-sides; for in other localities it ascends mountains to a great height. Mr. William Evans, of Edinburgh, has seen its hillocks at a height of fully 1,700 feet on the Pentland Hills and still higher on the Ochils.

The Irish naturalist Thompson observed the tunnellings of the Mole at Aberarder, about sixteen miles from Inverness, and the late Thomas Edward, of Banff, reported that although it used to be very rare in Banffshire, it has of late years become more numerous there. In the autumn of 1887 the present writer, while grouse-shooting in Elginshire, was one day much interested in observing the actions of a Mole travelling above ground.

In Lanarkshire, the late Edward Alston, who resided at Lesmahagow, in that county, reported it as sufficiently common in spite of constant persecution. It was found to be spreading rapidly in West Argyllshire, and in Mull it is said to have been accidentally introduced in a boatload of earth from Morven; but it appears to be unknown in the rest of the Scottish Islands.

With regard to the distribution of the Mole in Wales, there is not much information to hand. Its occurrence has been noted in Monmouthshire and in Carnarvonshire, beyond which county it finds the limit of its range westward in Anglesea. Commenting upon its absence from Ireland, William Thompson, of Belfast, remarks in his "Natural History of Ireland": "It is singular when entering Scotland and Wales at the nearest ports to Ireland, to see mole-hills in both these countries almost as soon as we land. They are

very numerous along the coast of Ayrshire, just opposite Antrim, and I have remarked them close to the roadside in Anglesea, near to Holyhead, which I mention on account of its western position."

It is curious that although the Mole is not found in Ireland the Irish have several names for it: *caochan* (the blind creature), *criadhluch* (the earth mouse), and *luch dall* (the blind mouse).

From the naturalist's point of view, the mole is especially interesting as furnishing a remarkable illustration of the adaptation of structure to habits. Spending most of its time underground as it does, in tunnels of its own construction, we note first that the cylindrical form of its body, pointed muzzle, and short limbs, must facilitate progress in its burrows; secondly, that the ears having no external conch, are not liable to be filled with the crumbling soil which is displaced as it works its way underground; thirdly, that the fur being inserted perpendicularly to the surface of the skin, will lie in any direction, and does not prevent a retrograde movement in the tunnel, should a retreat in that direction become necessary; fourthly, that the forelimbs, short, broad, and spade-shaped, with strong claws and worked by powerful muscles, are admirably suited for digging; and fifthly that the prehensile snout and long jaws set with sharp teeth are well adapted for seizing, holding, and masticating the earthworms, field slugs, and insect larvæ, on which it chiefly preys. The anterior limbs are singularly well adapted for the purpose to which they are applied, and the peculiar structure of the bones of the shoulder and forearm are in perfect harmony with the singular shape and direction of the hand. The joints of the digits are very short, with the exception of the terminal ones, which are almost as long as the rest of the hand; these are convex above, grooved beneath, tapering at the extremities, and each is furnished with a long acute nail which is rendered strong by having the terminal phalange (which enters into and supports the nail) cleft longitudinally at its point. Into this furrow in the bone a corresponding rib of horn on the inside of the nail passes, thus making the nail of more than usual thickness and strength. The palms are

directed outwards; the hand is susceptible of being only partially closed, which is effected by the inclination of the terminal joint above. When thus bent the hand is formed of two portions ; the one consisting of the palm turned outwards, and the other formed of the terminal joint at the digits, the direction of which is backwards, a structure which readily explains the mode in which the soil is shovelled away and flung backwards behind the animal when at work.

Keenness of sight not being required in the darkness of its underground chambers, that sense is reduced to a minimum of development, but contrary to popular belief the animal is not blind, although the eyes are very minute and completely buried in the fur which surrounds them. A German naturalist, Carl Hess, has proved by minute microscopical examination that the eye of the Mole is perfectly capable of seeing, and, in spite of its minute dimensions (1 mm. by 0·9 mm.) it possesses all the necessary properties for seeing that the most highly developed eye does; that it is, in fact, as well suited for seeing as the eye of any other mammal, and that in the matter of refraction it does not differ from the normal eye.

In order to bear out the theory of shortsightedness, the physiological reason was adduced that in its subterranean runs the Mole is accustomed to see things at short distances, and that its eye had become gradually suited to near objects. But to this, Herr Hess objects that the Mole when underground most probably makes no use of its eyes at all, as it would be impossible to see anything owing to the absence of light; but that when it comes to the surface, and especially when swimming, it does use its eyes. In order to accomplish this, it has only to alter the erect position of the hairs which surround and cover the eyes, and which prevent the entry of dirt when underground, and at the same time to protrude the eyes forward.

The sense of smell in the Mole is believed to be well developed to enable the detection of its prey, its enemies, and its own kind. The sense of hearing, also, is very keen. It will take alarm at the slightest sound, and will not come forth until all is still again. This has been proved by

direct experiment as shown by the French naturalist, Geoffory St. Hilaire.*

Few persons probably have ever had an opportunity of hearing the voice of the Mole, but the animal is not so mute as many suppose. Especially when alarmed or when seized on being taken out of a trap it will utter a loud and shrill squeak. At other times, when undisturbed, and apparently in a state of contentment, according to Mr. W. Evans, it will give vent to a low purring sound which has been likened to the purring of a cat or the distant "jarring" note of a Nightjar.†

As a rule the Mole is partial to light soils which are easily worked, such as old pasture, park lands, warrens, and downs. During the winter months it feeds almost entirely underground, but on warm summer nights it will run over the surface in search of food, and thus occasionally falls a prey to Owls. It dislikes too much heat and extreme cold, and consequently we find it tunnelling at different dep ths according to the prevailing temperature. In warm weather its runs are usually but a few inches below the surface, sometimes, indeed, so near it that the course of the tunnel may be readily traced by the broken surface. In cold and especially in frosty weather the runs are much deeper. Professional mole-catchers aver that during fine weather moles are most active at sunrise, and for a little while at intervals of about four hours until dark. In the winter they get into sheltered places, as under thick hedgerows and into gardens which have fruit walls, where they are often found by gardeners between November and March. The mole-catchers attack them chiefly in the spring when they are much more active, that being the breeding season.

The Mole usually pairs in March, sometimes as early as February. According to Bell the period of gestation "is supposed to be about two months or upwards," but Jesse more correctly states that the female goes a month with young, and has never more than six or less than two at a birth. The nest, which is formed by

* "Cours de l'Histoire Naturelle des Mammifères," 8vo, Paris, 1829, p. 34.

† Evans, "Mammalian Fauna of the Edinburgh District," p. 32.

excavating and enlarging the point of intersection of three or four passages, is generally lined with dry grass or dead leaves, sometimes with moss and even fur. The young ones, which are naked and blind at birth, begin to run in about five weeks when they are about three parts grown. They follow their mother for some time. Mr. W. Evans, of Edinburgh, who has obtained the young when about ten days to a fortnight old during the third week of May, states that they were then of a bluish-grey colour, very silky in appearance, and without fur.

Contrary to what might be expected from the nature of their haunts, Moles are fond of water. One kept in confinement was supplied with a vessel of water, and drank frequently. Sometimes it was seen to rush through the water and splash about in it. More than this, moles have been observed to swim well and voluntarily. They will not only cross ditches of running water and still pools, but have been found boldly swimming across rivers of considerable width.

Whether the Mole is injurious or not from an agriculturist's point of view is a question upon which, probably, there will be always some difference of opinion. Many farmers maintain that mole-hills are not only very unsightly, but that they prevent the mowing grass from being properly cut. They overlook the fact that if the hillocks were knocked about in the spring, and the fine soil of which they are composed were spread over the surface, they would have an excellent and inexpensive top dressing for their fields.

Another recommendation lies in the system of surface drainage which is effected by the Mole's "runs"; while a third, and perhaps the most important, consideration is the fact that the Mole preys not only upon earthworms and field slugs, but also upon the larvæ of many coleopterous and dipterous insects which are very destructive to the roots of grasses and other field crops. The late Mr. Henry Reeks of Thruxton, near Andover, who was a practical farmer as well as a good naturalist, was strongly in favour of sparing the Moles upon agricultural land.

If the natural enemies of the Mole were not destroyed, there would be much less need for trapping their velvet-coated prey.

Weasels kill Moles—as long ago remarked by Gilbert White in his fortieth letter to Thomas Pennant—so do Owls, when they can catch them above ground on summer nights; so do Buzzards. The common Buzzard is a capital mole-catcher, and in the vicinity of mole-hills will take up a position on some low bough of a tree, from which it will glide and seize a Mole the moment the earth moves on its approach to the surface. In this way (*i.e.*, by watching and jumping down) Buzzards destroy not only Moles, but numbers of rats and mice.

But the Weasel, the Owl, and the Buzzard are thoughtlessly trapped, poisoned, or shot, on the score of their interference with game, the result being that the farms are overrun with rats, mice, and Moles, and the farmers in self-defence have to pay for their destruction instead of leaving them to the supervision of "nature's police."

It becomes, then, a matter for consideration how best to get rid of Moles on land where, for the reasons above stated, they have unduly increased.

Macgillivray states that every Mole appropriates to itself a particular tract of ground, in which it forms a kind of fortress under a hillock, but this we are not able to confirm.

On the contrary, it is certain that many use the same "runs" in common, just as rats and mice do. This is made evident from the fact that a mole-catcher will trap Mole after Mole in the same "run" to the number of a dozen or more resetting his trap time after time nearly in the same spot.

To discover which are the most frequented "runs," the plan is to mark every fresh mole-hill by a light pressure of the foot, and to examine it next morning to see if a Mole has passed by and partially obliterated the depression by fresh upheaval. In two or three days it will be seen what part of the ground is most used, and there the traps may be set. Although iron traps may give less trouble to set, the kind of mole-trap most in vogue is the old-fashioned wooden one—a semicylinder of wood, with grooved rings at each end in which are fixed horsehair nooses kept in position by a peg in the centre and strained by a cord attached above ground to a pliant stick bent downwards. As the Mole

passes through one of the nooses and moves the peg aside, the pliant wand springs up, and the Mole is held tightly in the noose.

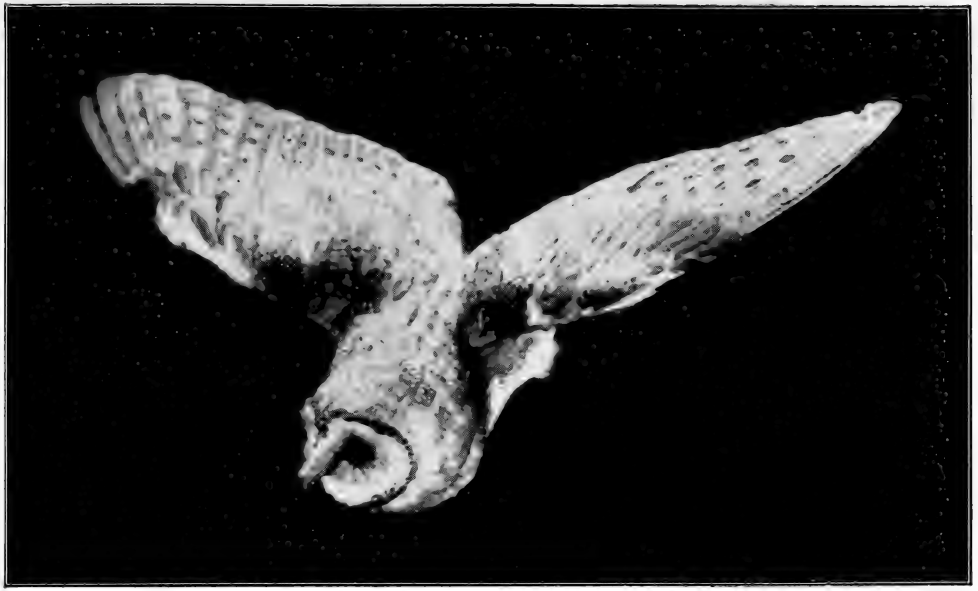
Moleskins were formerly held in some estimation for the lining of winter garments, waistcoats, and caps, but the fashion in this direction seems to have changed, owing probably to the facility with which warm clothing may be now cheaply obtained.

Although the colour of the Mole's fur is tolerably constant — velvety black inclining to grey, according to the light it is viewed in — some curious varieties are occasionally met with, and the following have been reported: — Light umber brown, reddish brown under surface, mouse colour with tinge of yellow, orange, apricot, amber coloured, cream colour, albino, and piebald, the last mentioned being the most uncommon variety of all.

THE WHITE OR BARN OWL.

(*Strix aluco, Brisson ; Strix flammea, Linn.*)

This most useful bird is unfortunately becoming somewhat rare, as almost every one's hand is against it. First, the egg-collector offers a tempting premium for its rather scarce eggs. Then there is a great demand for it from bird stuffers, as it is a handsome object when well stuffed and set up in a glass case. Lastly, gamekeepers make a point of shooting it as it flies, about sunset or on moonlight nights, beating the fields, as Gilbert White says, like a setter, often dropping down in the grass or corn, and hunting for mice, young rats, voles, and other pests. Gamekeepers appear to have an idea that owls of all kinds should be exterminated as destroyers of game. It is only fair to agriculturists to say that many of them recognise the extreme usefulness of the Barn Owl, and do all they can to preserve it. In many old barns in some counties, notably in those in the south-west, there are owl-holes just under the eaves, formed with ledges specially made for ingress and egress. On the other hand there are some agriculturists who do not appreciate the inestimable services of the Barn Owl, and shoot it without mercy. Seebohm in his exhaustive history of British birds holds that the Barn Owl is undoubtedly the farmer's best friend. He gives an instance in which twenty freshly killed rats were found in a Barn Owl's nest. He also says that in 700 "pellets" of this owl there were found the remains of sixteen bats, 2,513 mice, one mole, and 22 birds, of which nineteen were sparrows. The wing-cases of beetles are also sometimes found in the "pellets." Yarrell states that the Barn Owl feeds on young rats, mice, shrews, small birds, and insects, parts of all of which have been recognised at different times on examination of the "pellets."



THE WHITE OR BARN OWL (*Strix aluco*).


BRITISH MUSEUM
NATURAL HISTORY

Mr. Tegetmeier, in an interesting article, quotes Lord Lilford, who stated that he had seen a pair of Barn Owls bring food to their nest no less than seventeen times within half-an-hour. At this rate, if continued only for four and a-half hours, more than 150 rats and mice, "and such small deer," would be destroyed daily for the support of a nest of owls and the old birds. Mr. Tegetmeier asks: "Is it surprising that vermin abound when their natural enemies have been exterminated by farmers, gamekeepers, and *plumassiers?*" In an interesting work on the "Birds of Devon," the writer observes, "Feeding almost exclusively on field mice and rats, and destroying great numbers of these mischievous rodents, besides varying his diet occasionally with larger beetles and cockchafers, the Barn Owl renders immense benefit to agriculturists." Allusion is made in this work to Darwin's discovery that red clover cannot seed without the intervention of the humble bee to convey the pollen to the stigma, and that field mice destroy humble bees wholesale by devouring them and their honey comb; if consequently the owls are killed, field mice increase and multiply, and by exterminating the humble bees render the clover-seed crops a failure. The experiences of a well-known careful observer are also cited, who, in describing the contents of various nests of the Barn Owl, remarks that he found four species of mice at the same time in one nest, the common farm mouse; the little white-bellied, red-backed, short-bodied, harvest mouse; the large, thick-coated, full-headed, short-tailed grass mouse; and the long, sandy, long-tailed, long-eared field mouse. This experienced witness adds, "I never saw any kind of bird, rabbit, leveret, or other animal besides rats, moles, and mice." In Germany the Barn Owl is much appreciated. Professor Ritzema Bos states that it feeds on rats and mice of all kinds, as well as cockchafers, the destructive "Nun" moth (*Liparis monacha*), and other injurious insects.

In the United States there is a species of *Strix* closely allied to *Strix aluco*, having identical habits. A long description of this species, known as *Strix pratincola*, is contained in the Report for 1893 of the Department of Agriculture at Washington, in which it is remarked that all testimony goes

to show that the Barn Owl is one of the most beneficial of rapacious birds. Audubon remarks with reference to this American species, that after long observation he is satisfied that this bird feeds entirely on the smaller species of quadrupeds.

In the Report of the Departmental Committee of the Board of Agriculture on Field Voles in 1893 it is stated that white and brown owls prey upon these pests, which caused much mischief on hill farms in Scotland; and in their two schedules of the natural enemies of the vole the Committee place in the first category of "Vole-killers, harmless or nearly so to sheep, crops, and game," owls of all sorts, buzzards, kestrels, and the smaller seagulls.

The Barn Owl is found in all parts of the British Isles and in many other countries, though it is somewhat rare in the northern parts of Scotland. According to Seebohm it is really a tropical bird, found throughout the equatorial region of both hemispheres, and not ranging more than forty degrees north of the equator, except in Western Europe, where the influence of the Gulf Stream has produced a climate mild enough to allow of it wintering there. In length it is about fourteen inches, with very long wings reaching below the tail. The legs are long and thin, covered with downy feathers, and with long claws; there are no tufts on the head, which is light buff in colour. The usual colour of the under parts of the body is white and of the back buff, with bars and spots of blackish gray. The inside of the wings is white; the back and exterior of the wings vary somewhat in colour in different specimens.

The Barn Owl lays its eggs towards the end of April in church towers, barns, ruins, or old buildings, holes in rocks, or in hollow trees. Its nest is of the most rudimentary character. The eggs are pure white, and about one-and-a-quarter inches in length. From three to six are laid, and sometimes eggs laid after the first brood of owlets has come forth are hatched by the warmth of these young; so that owlets in various stages of growth may be found in the same nest.

Seeing that there is such an unanimity of evidence from

witnesses who have carefully studied the habits of the Barn Owl, as to its great utility, the necessity for the careful preservation of this valuable bird cannot be too strongly urged upon the whole rustic community.

The White or Barn Owl is included in the Schedule of the Wild Birds' Protection Act, 1880, which provides that any person taking or killing an Owl during the close season is liable to a penalty of £1. The close season is generally from the 1st March to the 31st July; but in some counties it lasts from the 1st February to the 31st August.

THE FRENCH DECENNIAL AGRICULTURAL INQUIRY OF 1892.

The Board have received through the Foreign Office a copy of the recently issued statistical tables giving the results of the Decennial Inquiry into the position of Agriculture in France in 1892. The investigation has been carried out, under the superintendence of M. Tisserand before he quitted his office of Director of Agriculture, through the Prefects of the 87 Departments, by special commissions appointed for each commune, who were charged with the duty of seeing that the returns were properly made.

This agricultural census is of a much more detailed character than the annual returns of area and produce of the crops; and, apart from the far greater number of particulars collected, the data, owing to the more exhaustive nature of the investigation, are to be taken as more accurate than, and therefore superseding, the statistics already published four years ago by the French Ministry of Agriculture.

The information collected is divided, as in 1882, into three heads. Part I. consists of the statistics of crops, and includes details of the area, amount of seed sown, total and average yield, and value of every crop, in 1892, as well as the mean yield in an average year. As regards animals (Part II.), in addition to the mere number of each species (with classification as to age, sex, purpose for which used, etc., among the larger animals), records were desired concerning the live weight, value, manure, births and deaths during the year, and the production of meat, milk, wool, honey, butter and cheese, etc. Silkworms were included in the inquiry. A further

portion (Part III.) of the inquiry extended to "rural economy," and comprised, besides a census of the agricultural population, investigation into the size and ownership of holdings and their capital and letting value, and into the wages of different classes of labourers, statistics of implements and machinery, manures, and improvements effected during the last ten years.

It should, perhaps, be remarked that the collection of these particulars does not appear to have been strictly synchronous. The instructions provided that all the details concerning crops were to be taken at the nearest possible moment to harvest; their value was to be determined according to the current quotations at the nearest market town. The census of animals was to be taken on November 30th; while the selection of the most convenient date for the returns under the heading of "rural economy" was left to the discretion of the commissions.

In commenting upon the following statistics, and in making comparisons between the figures for 1892, 1882, and 1862 (no inquiry having been made in 1872 owing to the recent war), it must be borne in mind that the explanatory Report on the latest Inquiry has not yet been published, and, consequently, that no account can be given of any circumstances accounting for the changes which have occurred. Comparisons are further rendered difficult as large variations in agricultural statistics often occur from year to year, and considerable differences may therefore be devoid of significance. Nor must it be overlooked that the figures for 1862 include those portions of Alsace-Lorraine which now no longer form part of French territory, and allowance must be made for a certain amount of decrease from this cause. Although, therefore, the figures for 1862 are quoted where possible, but little comment will be made upon them.

Considering, first, the areas devoted to cereal crops, we find that the total acreage under these is somewhat below that of 1882—in fact, the only crop to show an increase is oats. The area under wheat, which has exhibited great steadiness for many years in France, shows a very small decline, but it may be mentioned that the annual French agricultural returns indicate that the area in 1892 was pro-

bably rather below than above the average. The figures for the chief corn crops are as follows :—

Crop.	1862.	1882.	1892.
	Acres.	Acres.	Acres.
Wheat - - -	18,459,234	17,762,138	17,701,154
Rye - - -	4,762,896	4,307,394	3,866,531
Barley - - -	2,684,867	2,409,986	2,102,990
Oats - - -	8,209,971	8,918,162	9,399,560
Other Grains - -	4,466,459	3,889,603	3,552,665
Total -	38,583,427	37,287,283	36,622,900

Pulse crops also show a decline, from 819,630 to 777,062 acres, since 1882. Potatoes (for human consumption), on the other hand, exhibit a steady increase, the number of acres being 3,049,973 in 1862, 3,304,398 in 1882, and 3,641,154 in 1892. An increase is also shown in the area under carrots, turnips, cabbages, etc. (all for human consumption), but the figures cannot be fairly compared, since the 1892 returns include catch-crops, which were not usually ascertained in 1882.

Turning to the crops grown as food for stock, the area under roots exhibits a very considerable advance, namely, from 1,161,231 to 1,710,902 acres, during the decade. By far the most important of these is fodder-beet, while the group of "turnips, swedes, and mangolds" ranks next, and has indeed increased more in proportion than the beet. In the group termed "annual fodders" vetches show a small decline, and *Trifolium incarnatum* a rather larger one, but maize and cabbages have considerably augmented. Land under pasture, as a whole, has increased.

It is the industrial crops which, in so far as comparisons of single years at considerable intervals may be taken to accurately represent the facts, exhibit the greatest changes, and in fact form the most striking feature in the variations of areas under different crops. With but a single exception all the industrial crops which are grown in any quantity exhibit a large decline, especially colza, rape, hemp, and

flax. The exception—a very important one—is, of course, sugar-beet; while of the minor crops, tobacco (since 1882) and "others" show an increase; the latter may, however, possibly be due to a stricter inclusion of very small areas under the less usually cultivated plants. The figures for the more important of this class of crops are as follows :—

CROP.	1862.	1882.	1892.
	Acres.	Acres.	Acres.
Colza	497,742	229,130	167,876
Other Oil-seeds (rape, poppy, etc.)	231,565	108,880	70,417
Hemp	247,282	156,805	98,242
Flax	260,474	109,046	62,585
Sugar-beet	337,135	593,949	670,008
Tobacco	43,692	33,841	40,851
Hops	11,920	8,847	7,022
Other industrial crops	20,160	33,619	53,194
Total	1,649,970	1,274,117	1,170,195

In this section, however, inquiries have been instituted for the first time into the area under potatoes for starch (apparently hitherto included with other potatoes), amounting to 115,248 acres, nurseries (10,371 acres), and osier-beds (17,505 acres). If these are added to the other industrial crops we obtain a total of 1,312,825 acres, which is above the total for 1882.

As regards arborescent cultures, olives and almonds (planted in masses) have slightly increased; chestnuts have somewhat considerably, and mulberries slightly, declined. Vines also show a falling off from 5,732,398 acres in 1862 to 5,426,093 in 1882, and 4,447,208 acres in 1892.

Summing up the areas under different crops, we obtain the classification shown in the table on the following page. (The figures for 1862 cannot in all cases be given.)

The broad feature which appears to be brought out by this table is a slight decline in the actual agricultural and cultivated area during the decade.

The details of production present at this date comparatively little interest, although the final results now published for 1892 differ, often very considerably, from the annual returns for that year issued by the Ministry of Agriculture in 1893.

CLASS OF CROPS.	1862.	1882.	1892.
	Acres.	Acres.	Acres.
Cereals	38,583,428	37,287,283	36,622,900
Other alimentary grains	—	849,808	789,671
Roots and tubers	—	4,671,578	5,527,996
Annual fodder and green crops	—	10,119,089	10,128,781
Industrial crops	1,700,546	1,274,125	1,312,825
Gardens	—	1,061,361	955,463
Bare fallow	12,715,219	9,000,183	8,317,769
Total arable	65,624,494	64,263,427	63,655,405
Natural grass	—	14,391,554	15,347,206
Woods and Forests	23,013,484	23,354,406	23,518,273
Vines, fruit-trees, orchards, parks, &c.	—	7,505,915	6,756,164
Total cultivated area	—	109,515,302	109,277,048
Uncultivated area	—	15,443,766	15,378,687
Total agricultural area	—	124,959,068	124,655,735
Area of France	134,139,994	130,557,281	130,557,281

But the fluctuations in yield may be so great from year to year that a comparison of the total harvest or production per acre for the single years 1892, 1882, and 1862 leads to results of very small utility. Of more interest, however, are the changes in yields in an average year, although, until the Report is published, it is not possible to state whether these means are based upon the average of the preceding ten years or on other data. It may be noticed, for instance, that while steady though slow progress in the better cultivation of wheat and rye is recorded, barley and oats, on the other hand, appear to yield less per acre than formerly. In the case of wheat, the mean production has risen from 17·4 bushels per acre in 1862 to 17·8 bushels in 1892; and in rye the improvement in the same period is greater, viz., from 15·3 bushels to 17·5 bushels. Barley yielded a mean of 20·2 bushels per acre in 1892, or 1·6 bushels less than in 1862; and oats produced only an average of 24·8 bushels in 1892, against 27·3 bushels in 1862. Maize shows an increase, yielding 17·6, 18·4, and 20 bushels per acre in 1862, 1882, and 1892 respectively; as do potatoes, the yield of these

tubers in 1892 being 3·78 tons per acre, as against 3·22 in 1882.

Of industrial plants, colza now produces considerably less per acre; and rape about the same as in 1862, but much more than in 1882. Hemp has increased, while flax, after an augmented yield in 1882, has fallen back to the 1862 figure. But a curious result is shown by sugar-beet, of which the yield in an average year was stated to be 262·4 cwts. per acre in 1862, 287·1 in 1882, and only 207·6 in 1892—a very considerable decline. The production of wine from a given area appears to have fallen off since 1882, but comparisons with 1862 are not practicable.

The Decennial Inquiry also includes an estimate of the value of the produce in the years under consideration. Such estimates are of course greatly affected by the quality of the harvest of the particular year concerned, and it will be more convenient to deal with the estimated total value when the Report on the Inquiry is published. A short reference may, however, be made to the value per quarter or cwt. of the various kinds of produce; although, apart from the difference in value caused by the abundance or deficiency of the crop itself, the changes noted cannot furnish any guide to the course of prices in other countries, owing to the constant changes in the French customs tariff. It will be therefore sufficient to remark that the average value of all kinds of grain, and especially wheat, as recorded in these Returns, has fallen; but that the straw has very considerably increased—wheat straw, for example, being worth 2s. 1d. per cwt. in 1892 against 1s. 7d. only in 1862, while rye straw has gone up from 1s. 6d. in the earlier year to 1s. 10d. in 1892. Potatoes and fodder roots have fallen, while clover, lucerne, sainfoin, and all grass show a very large rise between 1882 and 1892; but these changes may perhaps be due to the fact that the figures are for single years only. Industrial plants are all now worth less (with the single exception of sugar-beet), at least since 1882; the fall is most pronounced in the case of colza. For hops the values are returned at 89s. 2d. per cwt. in 1862, 207s. 8d. in 1882, and 90s. 5d. in 1892.

The following table shows the number of farm animals in France at the last three enumerations :—

Animals.	1862.	1882.	1892.
Horses - - -	2,914,412	2,837,952	2,794,529
Mules - - -	330,987	250,673	217,083
Asses - - -	396,237	395,833	368,695
Cattle - - -	12,811,589	12,997,054	13,708,997
Sheep - - -	29,529,678	23,809,433	21,115,713
Pigs - - - -	6,037,543	7,146,996	7,421,073
Goats - - - -	1,726,398	1,851,134	1,845,088

The number of horses and asses thus appears to have declined, while mules show a very considerable falling off. As regards cattle, which exhibit an increase, it may be noted that bulls have declined from 339,000 in 1862 to 285,000 in 1892 ; and that draught oxen also show an appreciable diminution from 1,518,501 to 1,387,050 since 1882. Cows (6,406,261 in 1862 and 6,673,460 in 1892), and more particularly young cattle, however, show a marked increase. The large decline in sheep appears to extend to all classes and ages, but comparison in detail with 1862 cannot be made. Pigs appear to have increased, and goats exhibit a similar tendency.

Poultry and rabbits formed a subject of investigation, and the numbers of these farmyard animals are returned as follows :—Fowls, 54 millions (showing a progressive advance from 43 millions in 1862); geese, 3,500,000 ; ducks, 3,700,000 ; turkeys, 2,000,000 ; guinea fowl, 300,000 ; pigeons, 8,000,000 ; and rabbits, 15,000,000.

Judging from a comparison between the single years 1882 and 1892, it would seem that the consumption of meat (home produce), especially pig-meat, is increasing, the total net weight which the slaughtered animals are reckoned to have yielded having been 1,322,893 tons in 1892, as compared with 1,217,818 tons in 1882. Poultry and game are not comprised in these totals, nor is horseflesh, of which statistics are for the first time collected. This latter item amounts to nearly 12,000 tons in the year. So far as a total for 1862 can be given, the total quantity of beef, veal, and mutton (but apparently not lamb) was 571,073

tons, the corresponding figures in 1882 and 1892 being 819,248 tons and 857,300 tons respectively. Goat's flesh appears to be less in favour than formerly, and the total production of mutton is also slightly below that of 1882.

Some light is thrown upon the question as to how far the animals are now matured at an earlier date than previously by the following figures, giving (1) the average age at slaughter; (2) the average net weight of the meat of each animal, with comparisons for earlier years where practicable.

Animals.	Average net weight of meat per animal.			Average age at slaughter.			
	1862.	1882.	1892.	1882.		1892.	
	lbs.	lbs.	lbs.	Years.	Months.	Years.	Months.
Oxen, Cows & Bulls	495	581	583	6	3	5	10
Heifers	—	295	312	1	11	1	11
Calves	86	108	114	–	2	–	2
Sheep	40	46	44	2	9	2	8
Lambs	—	20	20	–	4	–	4
Pigs	194	213	207	1	1	–	11
Goats	40	42	40	4	6	4	5
Horses	—	—	497	–	–	16	–
Mules	—	—	328	–	–	15	–
Asses	—	—	191	–	–	15	–

In the case of cattle, therefore, it would appear, so far as can be judged from single years, not only that the age at slaughter has decreased, but that the animals have been quite as effectually fattened by the time they attain the earlier age.

Concerning dairy produce, it would appear that 5,407,126 milch cows in 1892 produced 1,694,286,000 gallons of milk; which, on the supposition that one-tenth of the cows, owing to disease and accidental causes, yielded no milk, gives an average per head of about 350 gallons per annum. In 1882 5,019,670 milch cows are stated to have yielded 1,500,532,000 gallons, or about 330 gallons per cow. 475,266,000 gallons of milk are stated to have yielded 2,684,275 cwts. of cheese—a much better rate of production than in 1882, when 525,030,000 gallons only yielded 2,252,957 cwts. of cheese. Except in the

case of Gruyère, no separation of the kind of cheese manufactured was made in 1882. It appears that more Gruyère cheese is now produced from a gallon of milk, but the increase is not so great as among the remaining kinds taken together. No particulars are given from which a comparison of the quality of the cheese made in 1882 and 1892 could be drawn. A very large increase is shown in butter, of which 129,665 tons were produced in 1892, as against 73,515 tons only in 1882.

THE AGRICULTURAL POPULATION OF GERMANY.

The statistics of occupations in Germany are not collected at the usual quinquennial enumeration of the population, but form the object of a special inquiry; and the statistics of the last occupation census, taken on the 14th June, 1895, have recently been published by the German Government.

The results are exhibited in two ways, firstly, by considering every person in the Empire to be directly dependent upon some kind of employment—children and domestic servants being thus placed in the same category as the bread-winners of the family—and, secondly, by classifying only the persons actually occupied in the various employments. The whole population of the empire amounted on the 14th June, 1895, to 51,770,284 persons, of whom 18,501,307 (or 35·74 per cent. of the total) are classed as agricultural (including "forestry and fishing"); while industries accounted for 20,253,241, or 39·12 per cent., and commerce for 5,966,845 or 11·52 per cent.; the remainder being made up of the army, navy, professional, and independent classes, etc. In 1882 (the year of the preceding occupation census), the corresponding number of the agricultural class was 19,225,455, or 42·51 per cent. of the total population; industries at that date claiming 35·51 per cent., and commerce 10·02 per cent. It thus appears that the agricultural and industrial classes have changed places, and that the commercial class is now of more importance than previously.

As regards the number of persons actually engaged in the

different occupations, the German census divides the population up as follows :—

	Number.	Per cent.
Persons actually occupied - - - - - -	20,771,090	40·12
Domestic servants living with their employers - -	1,339,318	2·59
Dependents (i.e., chiefly women and children) -	27,517,275	53·15
Independent persons without occupation - - -	2,142,601	4·14
Total - - - - - - -	51,770,284	100

The principal changes in these proportions during the last fifteen years, are an increase of 1·13 per cent. in the percentage of actually occupied persons (*i.e.*, they formed 38·99 per cent. of the population in 1882, and are now 40·12 per cent.), and of 1·14 per cent. in the persons without a profession; and decreases of 1·93 per cent. and 0·34 per cent. in the numbers of dependents and domestic servants respectively.

In estimating the proportion of people engaged in any occupation it is the figure 20,771,090 which is usually taken as the whole occupied population, the servants, dependents, and persons without profession being excluded.

The number of persons actually engaged in agriculture (including forestry and fishing) is returned at 8,292,692 (39·92 per cent. of the total), as against 8,236,496 (46·71 per cent.) in 1882. It thus appears that the total number of persons has increased, although the ratio to the population has considerably declined. As it was seen above that the total number of persons (including children, etc.) directly dependent upon agriculture has declined during the fifteen years, it follows that the whole of this decline can be attributed to the dependents, who have indeed decreased from 10,564,046 to 9,833,918, and to the domestic servants, whose numbers are 374,697 against 424,913 in 1882.

Comparing agriculture with industries, we find that the industrially occupied class numbers only 8,281,230, or less than the agricultural. Here there has been a great increase in the dependents, as well as in the occupied, and we find a much larger proportion of persons (compared with the number of workers) dependent upon industry than upon

agriculture. Nevertheless, the increase in the dependents of the industrial class has not been quite proportionate to the increase of the workers. In fact, it appears that there is, relatively to the total number employed, a decrease in the number of dependents in all occupations, this being most marked in the case of agriculture. Of the three large groups —agriculture, industries, and commerce—the first-named has the smallest number of dependents to each individual worker.

This being the case, we are prepared to find that the number of women employed in agriculture far exceeds the number in other industries: in fact, the women engaged in agriculture number 2,753,154, or more than half the whole number of occupied women, who amount to but 5,264,408 altogether (this is of course exclusive of the domestic servants, numbering over a million, living in the households of the occupied persons). The women employed in industries amount to 1,521,133.

Contrary to what has been observed in Great Britain, the figures show that the total slight increase in the number of persons engaged in agriculture is entirely due to the women, the men showing a decline. This may, however, possibly be due to a more exact inquiry into the position of dependents helping the head of the household; a somewhat different classification may thus have transferred some persons from dependents to workers. But dependents helping the head (who are counted as workers), nevertheless appear to have decreased by 2 per cent. The possibility of alterations in classification, owing to more rigid scrutiny, may, of course, also modify other changes in proportions noted hereafter. The numbers of each sex following agriculture are as follows:—

	Numbers.		Increase or Decrease.	
	1895.	1882.	Number.	Per cent.
Men	5,539,538	5,701,587	−162,049	−2·84
Women	2,753,154	2,534,909	+218,245	+8·61
Total	8,292,692	8,236,496	+56,196	+0·68

A further analysis is made of the persons engaged in various trades, who are divided into the following three categories :—

(a) Persons working on their own account (including superior managers);
(b) Foremen and office staffs;
(c) Other assistants, day-labourers, and workpeople.

In agriculture the second class is naturally very small, and the figures work out as follows :—

	Men.	Women.	Total.
Persons working on their own account	2,221,826	354,899	2,576,725
Foremen, etc.	78,066	18,107	96,173
Labourers, etc.	3,239,646	2,380,148	5,619,794
Total	5,539,538	2,753,154	8,292,692

In this connection it is interesting to note that the persons working on their own account have 6,550,403 persons (or 2·54 per head) dependent upon them, while the workpeople have but 3,141,215 dependents, or 0·56 per head.

A further subdivision of the class ranked as agricultural may be made as follows :—

Occupation.	Number.		
	Male.	Female.	Total.
Farming, breeding of animals useful to agriculture, dairying, cultivation of vines, vegetables, fruit, tobacco, etc.	5,315,225	2,730,216	8,045,441
Nursery and market gardens, including wreath-making and arboricultural schools	92,916	15,546	108,462
Breeding of animals (bees, silkworms, fish, singing birds, dogs, etc.), also zoological gardens and aquaria	2,064	78	2,142
Forestry and hunting	105,797	6,129	111,926
Fishing (sea)	9,442	702	10,144
,, (inland waters)	14,094	483	14,577
Total	5,539,538	2,753,154	8,292,692

In view of the decrease in the proportional number of persons depending upon the actual wage-earners, the details given as to the ages of the occupied persons are interesting. It appears that there is a tendency to commence work in every industry at a lower age than at the date of the previous census, which tendency is, however, least marked in the case of agriculture. But where farming differs most essentially from industries, and indeed from all other occupations, is in the large and increasing number of old persons employed. At all ages from fifty upwards the ratio of agriculturists has increased since 1882, whereas in all other occupations the percentage of persons over fifty has very considerably declined. This increase in the percentage of both young and old in agriculture accords with the greater proportionate decrease in the number of dependents noticed above.

A special table is also given showing the number of children and of very old persons engaged in different occupations, from which it appears that agriculture occupies a very prominent position in both respects: of the occupied children under fourteen years of age (including the domestic servants in this case) no less than 63 per cent. (boys 72 per cent., and girls 48 per cent.) are engaged in agriculture, and of the old persons over seventy, 59 per cent. of the occupied are similarly engaged. Excluding domestic servants the proportion of girls under fourteen rises to 79 per cent.

The foregoing statistics apply only to the primary occupations of the people; there are, however, in Germany, as elsewhere, numerous persons who have also a secondary occupation. A secondary occupation is defined to be any remunerative employment which is practised in addition to the principal occupation, and which contributes materially to the total income. The total number of persons returned as having such a secondary employment is 3,273,456 (2,946,507 males, and 326,949 females), including rather more than 200,000 persons of independent means without a chief occupation. The number of *cases* of secondary occupation returned is, however, 4,949,702. The difference is to some extent doubtless made up by servants and dependents who

have some subsidiary employment, but their number is not given, although it is stated to be less than the difference in the case of both men and women.

As regards the agricultural class, 1,049,542 (12·7 per cent. of the occupied) have also another occupation, while the number of cases where agriculture is named as a secondary employment is 3,649,445.

Compared with 1882, it appears that the number, both of persons (male and female) and of cases of secondary occupation, has increased, and in about the same proportion as the population. But here again a great difference is to be observed between agriculture and other industries, for agriculturists are now seeking in far greater numbers to add to their resources by other means than are the remaining classes of the population; while all the other employments (except only the persons of independent means or without occupation) show a considerable numerical decline, which is more than counterbalanced by the increase in the number of farmers with a subsidiary pursuit. This is exhibited in the following table:—

Class.	1895.		1882.	
	Number with a secondary occupation.	Per cent. of the occupied persons of each class.	Number with a secondary occupation.	Per cent. of the occupied persons in each class.
Agricultural class -	1,049,542	12·66	671,404	8·15
Industrial ,, -	1,491,865	18·02	1,693,321	26·47
Commercial ,, -	384,104	16·43	397,927	25·34
Servants not living with their employers and miscellaneous labourers - - -	31,333	7·24	55,960	14·08
Army and professional class - - -	115,277	8·08	142,218	13·79
Persons of independent means or without occupation - -	201,335	9·40	179,679	13·27
Total - -	3,273,456	14·28	3,140,509	16·54

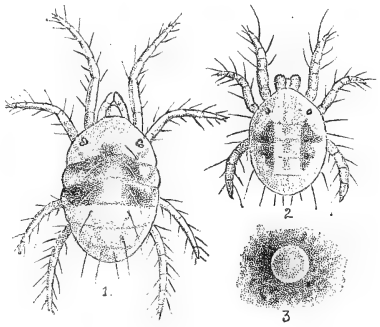
These figures would appear to indicate that the people in all classes of employment tend more and more to devote the

whole of their time to their main business, excepting only in agriculture.

The statistics of the cases of secondary occupations indicate no very striking changes in the proportions in the different classes of work since 1882. As a subsidiary employment, agriculture appears to offer the greatest attractions, as practically three-quarters of the total number of such occupations are returned under this head. If the whole number of professions followed is considered, *i.e.*, adding the cases of secondary employment to the primary, it appears that 11,942,137 persons follow agriculture either as their chief or second occupation, while 8,899,641 persons can claim to belong to the industrial class, and 2,908,151 to the commercial.

THE RED SPIDER, OR SPINNING MITE.

(*Tetranychus telarius, var. humuli ?*)



1, Full-grown mite. 2, Immature mite, with six legs. 3, Egg. All much magnified.

The spinning mite, or red spider, threatened to cause very serious injury in the hop plantations this season, but a succession of showers and a fall in the temperature opportunely checked its ravages. In 1868, and again in 1893, this insect did much mischief in many hop grounds. The leaves fell off, the burr or blossom could not develop into cones, and, in some instances, the plants were completely shrivelled up. In most seasons, at least in those in which rainfall and temperature are normal, spinning mites can be found upon the large leaves of the hop plants, especially where the soil is shallow, but in the two years just mentioned they multiplied with wonderful rapidity. They were found upon the small leaves high up the poles, also upon the burr, and even in the cones themselves.

In the present year there were grave indications in the sultry days at the beginning of August that there would be an equally rapid development of this pest. The lower leaves

turned yellow in many grounds, and the yellowness was fast spreading up the poles.

Upon the under-surfaces of the leaves thick webs were spread from mid-rib to mid-rib, under which the mites were seen actively sucking up the juices. All sorts and conditions were there, varying in size and differing in colour, but the greater number of them resembled the adult specimen in the figure. Now and then one was seen of a darker yellowish hue, approaching brown, but this was exceptional. Many eggs, which are perfectly globular, were suspended as it were in space between the mid-ribs, but upon close inspection with a microscope it was seen that they were kept in this position by means of fine threads stretched from side to side.

It was curious to note the instantaneous effects of rain, two dull days, and a fall of temperature, upon the mites. There was, naturally, an increased supply of sap to the plants from the rain, which in a degree arrested the yellowing of the leaves, but there was also an immediate and very marked check to the harmful activity of the spinning mite.

Life History.

The spinning mite of the hop plant passes the winter in the perfect state under stones and clods, in the bark of trees, and in the clefts and under the dried rind of hop poles. It is not noticed, at all events in numbers or as actively injurious, unless there is at least normal summer-heat, and it only multiplies in a dangerous degree when the day and night temperatures are abnormally high. In such circumstances the increase in its numbers and the rapid spread of its harmful influence are remarkable. Eggs are abundantly laid and, as above described, fixed in position by threads. The comparatively large and round egg is pellucid white at first and finally becomes slightly dark-coloured. The mites emerge from the eggs in five or six days, and at once begin to feed on the leaves. At first they are pale greenish-yellow in colour, with dark patches on both sides of the body; they become more tinged with yellow later, and some specimens have been found of a very light brown

hue, but in no case have they been found of a distinctly red colour.

In the earlier stages of their existence the mites have only three pairs of legs, but the full grown insect has four pairs of legs. There are two stiff hairs upon each joint of the legs, and the claws are furnished with long, stiff hairs, upon the ends of which, or upon some of them, are little round balls, or pads, supposed, as Murray says, "to be an essential part of the spinning apparatus." The head is provided with a stout pair of mandibles with hooked ends for biting into the tissues of the leaf, and the mouth has a sucking apparatus which is inserted into the tissues. Very far behind the head are the red eyes. On the under side of the mite, towards the end of the abdomen, there is a "conical nipple," to use Mr. Murray's words, "from which the threads of the web are drawn out and guided by the motions of the mite and by the action of the minute claws and hairs of the legs."

A badly infested leaf has its under side completely covered with a dense web, under which eggs are found in abundance, as well as quantities of mites of all sizes feeding upon the juices of the leaf. The leaf becomes yellow, and, as a rule, finally falls off, when the insects escape into the earth. Mites left on the leaves upon the plant retire into the cracks and under the rind of the poles; they have great power of locomotion, and travel very rapidly quite independently of their webs.

This spinning mite of the hop plant differs in many important respects from the typical spinning mite cited as *Tetranychus telarius* by Murray and other entomologists, and should be defined as a distinct variety, or even as a distinct species. It is different in shape and colouring from Claperède's figures of *Tetranychus telarius*, as adopted by Mr. Murray, and as described by many writers. Though it is admitted that the nature of the food supplies of these mites may affect their colouring in some degree, it does not seem possible that the differences in the food could be sufficient to change the colour from very light brown—the darkest shade which has been noted in mites upon hop plants—to reddish or brick-red, which is the colour of the adult typical

Tetranychus telarius, according to Murray, Taschenberg, and others. It appears to be just as distinct from *Tetranychus telarius* as *Tetranychus cucumeris*, the mite found upon melons and cucumbers.

Modes of Prevention and Remedies.

It is most difficult, and it may be said almost impossible, to prevent these spinning mites from getting on the bine and leaves. They are most agile in movement, and travel up the bine rapidly. Plants on wire and string seem equally liable to attacks, as the mites crawl up the bines. To pull off the lower leaves is, therefore, of little use. The application of caustic substances close round the hill is ineffectual, as the mites are so tiny that they would not be affected by such materials as lime or kainit, and it would be dangerous to apply gaslime in quantities sufficient to destroy them. It would also be impossible to get at the mites in the cracks of the poles and posts for wire work. When a drought commences in June and there is a probability of its continuance, it would be useful to immediately syringe hop plants upon which the mites are seen with cold water, or with water, soft soap, and sulphide of potassium, before the webs are made, or before they are plentiful and thick. This syringing must be heavy and frequent, mere spraying will not suffice, as it is well known that the ordinary spraying with quassia and soft soap has a very slight influence upon them. Hop plants that have been sprayed three or four times for aphis-blight have been found to be badly infested by these mites. To be effectual, syringing must be done early, vigorously, abundantly, and with hand machines. When the webs are well established, even this drastic syringing is often unsuccessful.

Sulphuring, that is applying "flowers of sulphur" by means of a horse machine which blows the fine particles on and under every part of the hop plants, is supposed by some to have a prejudicial effect on the mites, but it is believed that this is of little if any benefit. Hop plants are sulphured almost in the ordinary course of cultivation, but the mites are not hindered by this in the least degree. Leaves have been examined upon which the webs of the

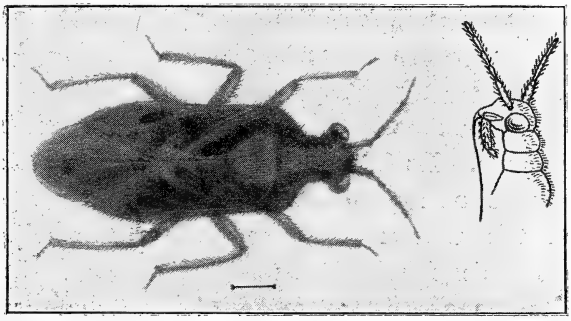
mites were thickly covered with particles of sulphur, and the mites in the webs immediately in contact with the sulphur were lively and unconcerned. Paraffin emulsion has been of considerable effect when used in the early stages of the attack. This is made by mixing 6 lbs. of soft soap and 7 gallons of paraffin with 100 gallons of water. The soap is dissolved first in boiling water and poured into a tub containing the paraffin, the whole being churned up with a force pump. The mixture is afterwards diluted to the proper strength. It is important that the water used for this emulsion should be soft; it can be made soft by adding soda or borax.

Sulphide of potassium, known commonly as liver of sulphur, the foundation of several washes for insects, has also been used with some advantage. It is readily soluble in cold water, but it must not be allowed to stand, as it loses strength rapidly. It may be applied in the proportion of $2\frac{1}{2}$ lbs. to 100 gallons of water; a little soft soap mixed with it tends to keep it upon the leaves.

Liver of sulphur is also a remedy for some fungoid affections of plants, and would probably be more efficacious than sulphur applied in the form of a powder. It is so soluble that it may be put in with soft soap and quassia and with other insectifuges and insecticides.

AN ORCHID BUG.

(*Phytocoris militaris, Westwood.*)



Phytocoris militaris, much magnified ; line showing natural size.

Information has been received by the Board of serious injuries to valuable orchids growing in orchid houses, especially to *Dendrobium phalænopsis*. The leaves were found to be blotched with patches of pale yellowish or greyish colour, and the plants appeared weakly and in a languishing state from the disorder of the leaves. Many leaves died, and in these cases the plants themselves soon died also. The injury evidently was not of a fungoid character, but, from the nature of the blotches, seemed to be caused by the punctures of an insect, although for a long time none was discovered. Upon watching the plant at night a small insect was, however, detected sucking the juices of the leaves, and this was manifestly the author of the mischief. A close examination of the sphagnum and peat round the roots and pseudo-bulbs revealed the presence of many of the same insects. They evidently belonged to a species of the plant bugs of the order *Hemiptera Heteroptera*, and were in two distinct forms, viz., the perfect insect with fully developed wings, and the nymphal form with the rudiments of wings. The latter form was in two or three stages, defined by increased size and the pro-

gressive development of wing-pads. The colour of the insect in these stages is yellowish with wide black lines on the thorax, while the wing-pads, or rudimentary wings, are black. There are very slight markings or borderings of red upon the sides of the body and on the margins of the wing-pads, which become rather intensified after the first and second moults. The bugs have six legs and an enormously long rostrum or sucking apparatus, which in the early nymphal stage is two-thirds the length of the body; but in the later nymphal stages it is not so disproportionately long.

The perfect insect is bright blood-red with black or blackish-brown markings. Its head is blood-red and the black eyes are very large and prominent; it has two broad black stripes on the thorax extending down the wing-cases; its six legs are red, with dark brown feet; and its three-jointed antennæ are dark brown. Its rostrum extends to half the length of the body, though it is not so long as in the nymphal stages of the insect; it is composed of a tube with a sharp red point which works in a case, or groove, and within the tube are sharp lancet-like suckers which are thrust into the leaves for the extraction of their juices.

Nothing more is known of the insect at present. In all probability the eggs are laid upon the orchid stems, in their peculiar folds, and the perfect insects and nymphs retire during the day into the sphagnum, moss, or peat surrounding the roots. The insect is no doubt brought over with imported orchids, and in some orchid-houses it seems to have gained a permanent habitation.

With regard to means of prevention and remedies, it is necessary that all plants newly imported, or newly acquired, should be carefully examined. Of course it is difficult to do this satisfactorily, as the insects in the egg state and in the early nymphal stages can hardly be discerned without a magnifying glass, and in these forms they may easily escape detection. Spraying with quassia and soft soap has been practised with advantage. Dusting with tobacco powder was of no apparent benefit.

AGRICULTURAL AND MISCELLANEOUS NOTES.

Co-operation in the Irish Poultry and Egg Industry.

A scheme has been drafted by the Irish Organisation Society for the formation of poultry-rearing associations on a co-operative basis in the rural districts of Ireland. As a preliminary step, a special organiser and instructor has been appointed to afford advice and assistance to existing dairy and agricultural societies desirous of taking up the poultry and egg industry as a branch of their business, as well as to committees formed in districts where it is proposed to establish poultry societies on co-operative lines. The system of organisation of new centres explained in the draft scheme is interesting. After a provisional committee has been formed, if the locality appears to be one suitable for the establishment of a society, a convenient centre will be selected for its headquarters. It is considered advisable, in districts where a co-operative agricultural or dairy society desires to take up poultry rearing, to establish a separate association for the latter business in order to secure the co-operation of the poorest classes by fixing a very low share qualification, and also, if possible, to enable female members to serve on the committees, which they rarely do in the existing societies.

All the business of the poultry society would be transacted from the centre, which would be placed in charge of a man or woman thoroughly experienced in all branches of the industry. The committee would hold its meetings there at least once a week, and supervise the working of the society. The centre selected would be fully equipped as a poultry farm, with one or more acres of land, and suitable buildings

and plant; the latter would consist of incubators, cramming machinery, a small grinding mill for home-grown corn, bone-crushers, etc. It would also stock a quantity of the necessary packing cases, packing materials, and feeding stuffs. A pony and cart for collecting fowls and eggs would also be required. Stock-birds and sittings of eggs would, in the first instance, be supplied to the members of the society, both at the centre and at the auxiliaries, so as to secure new blood. These birds and eggs would be furnished at as near cost price as possible to members.

Around the centre would be grouped "auxiliaries," or small associations of poultry keepers, say one in each parish, for a radius of from four to six miles distant. These "auxiliaries" would act as feeders to the central society by supplying "store" (*i.e.*, lean) fowls for fattening, and eggs. These latter might be either collected by the society's cart or sent in jointly by the members. In both cases the scheme provides that they should be delivered or collected three times a week to ensure freshness. "Store" poultry would be collected at the "auxiliaries" on a certain day in each week at convenient places, the members bringing them in. They would then be classified and all immature birds rejected by the manager of the society.

Both poultry and eggs would be paid for at the time of collection or delivery, each member receiving a docket stating the number and description of fowls or eggs bought, with the price paid, which would at first, at all events, be regulated by the local markets. The price would invariably be determined by the *quality* of the poultry and eggs purchased. Both poultry and eggs would, as far as possible, be bought by weight.

Every poultry society would provide instruction gratis to any of its members—male or female—desiring it. Local persons would be employed, as far as possible, for killing and plucking poultry and for making packing cases for poultry and eggs. It is recommended that these packing cases should be non-returnable, that wood-wool should be used in preference to straw for packing cases, and that eggs sold by the societies should be dated, as in Denmark, and marked in

such a way as to facilitate the identity of any members not sending them in fresh. The sale of eggs and poultry may eventually be carried out through the Irish Co-operative Agency Society; but the young societies are advised to concentrate all their efforts at first in producing articles of first-rate quality, and subsequently on keeping up this standard, so as to attract the English consumer and then retain his custom. Until this is accomplished it is suggested that it would be better not to attempt selling on the London market, but rather to seek outlets in other centres until the requisite high standard of excellence for the London trade has been attained.

SUGAR-BEET IN THE UNITED STATES.

Experiments in the cultivation of sugar-beet have been made in various parts of the United States under the direction of the Chemistry Division of the Department of Agriculture, and for several years experiment-stations were maintained by the Department in Nebraska, Florida, and Kansas. The results of these investigations have shown that sugar-beets, possessing satisfactory saccharine qualities, can be grown in parts of Colorado, Michigan, Minnesota, Nebraska, Nevada, South Dakota, Utah, Wisconsin, California, Arizona, and New Mexico. In his report for 1897, the Chief of the Department of Chemistry says: "The northern parts of our Eastern and Middle States and the States of Oregon and Washington have at least an equal chance for the successful production of beet-sugar with the fields of Germany and France. The irrigable parts of the great South-West, it is believed, have advantages of soil and climate which will enable them to enter into competition even with the Hawaiian Islands and Cuba."

Statistics of the acreage under sugar-beet in the United States are not published annually; but in 1893 it was estimated that at least 24,000 acres were devoted to the crop, and since that year the area has undoubtedly increased.

As regards the prospects of the development of a beet-sugar manufacturing industry, the economic conditions of

manufacture are held to be in many respects as favourable as in Europe. The one great drawback is the relatively higher cost of labour. In spite of this difficulty, however, beet-sugar factories have been established with success in California and in one or two other States, but the number of such establishments in operation at the beginning of this year was only seven, although three new factories were in course of erection, and proposals were being considered for the erection of another. For some years the United States paid a bounty on the production of beet-sugar, but the bounty law was repealed in 1894.

The estimated quantity of beet-sugar produced in American factories in 1896 amounted to 40,000 tons, or 10,000 tons in excess of the production of the previous year. In 1891 the output of beet-sugar was only 5,000 tons, but it has since steadily increased.

The annual consumption of sugar in the United States has increased during the past ten years (roughly) from 54 lbs. to 64 lbs. per head of the population, and the total yearly consumption is now about 2,000,000 tons. The imports into the country during the past five years, distinguishing the chief sources of supply, are shown below:—

	1892.	1893.	1894.	1895.	1896.
From—	Tons.	Tons.	Tons.	Tons.	Tons.
Cuba - - -	886,000	823,000	950,000	824,000	488,000
Europe - -	136,000	208,000	259,000	177,000	345,000
British West Indies	116,000	149,000	115,000	86,000	97,000
British Guiana -	62,000	71,000	60,000	49,000	65,000
Hawaii - -	117,000	129,000	146,000	122,000	157,000
Other Countries -	271,000	301,000	410,000	338,000	587,000
	1,588,000	1,681,000	1,940,000	1,596,000	1,739,000

From the above statements it will be seen that the home production of beet-sugar represents but a very small proportion of the total supply of sugar annually required for consumption. It seems to be clear, however, that the cultivation of sugar-beet is capable of considerable extension in the United States, and that the future of the industry depends now upon the extent to which capital is attracted to

the establishment of beet-sugar factories and refineries. Hitherto, the relatively higher cost of labour has apparently been an obstacle to rapid expansion, but the difficulty will probably be solved by the introduction of labour-saving machinery.

The Chief of the Division of Chemistry, after an exhaustive investigation of the whole subject, has evidently come to the conclusion that the future development of the industry is assured, for he says, in his report for 1897, "with an annual consumption of 2,000,000 tons, and with a certainty of rapid increase, the demand for sugar promises to be the salvation of American agriculture."

EXPERIMENTS UPON FINGER AND TOE IN TURNIPS.

The Durham College of Science has for some time past conducted experiments, on behalf of the County Councils for Northumberland, Durham, and Cumberland, into the best methods of preventing finger and toe in turnips. Professor W. Somerville reports that in 1896, as in former years, the investigations were conducted in the garden attached to the College. The plots were all duplicated, two plots being practically equivalent to an area of $\frac{1}{400}$ acre.

The soil used for inoculation was taken from a portion of the garden which grew a diseased crop of turnips the previous season. The diseased soil and the antiseptic substances were mixed and applied in May, shortly before the sowing of the turnip seed (Fosterton Hybrid). The results may be briefly summarised as follows:—(1). An application of 50 lbs. (equal to about 18 tons per acre) of diseased soil alone infected the crop to the extent of producing 90 per cent. of diseased turnips. (2). Slaked lime proved rather more effective in curing the disease than quicklime (*equivalent* quantities being used in each case), though both acted very efficiently. (3). Lime from the magnesian limestone was rather more effective than lime from the carboniferous formation. (4). One-year-old gas lime acted much more effectually

than the same substance used in the fresh condition in 1895, but the gas lime acted more powerfully in the direction of increasing the weight of roots than in diminishing the disease. (5). Copper sulphate, whether used in the dry form or in solution, again showed its capacity for curing the disease. (6). A thoroughly dry condition of soil diminished the disease, though not very materially.

Four plots were set apart to deal with the question of the transmission of the disease through the dung of cattle feeding upon diseased turnips. The dung was mixed with ordinary soil in the proportion of three of soil to one of dung, and 50 lbs. of the mixture was applied per plot. The dung used on two plots was produced by cattle fed upon sound and diseased roots respectively. The dung used on a third plot differed from that on the two former only in so far that the refuse from the animal's trough, consisting of bits of diseased turnip, dirt, etc., was mixed with it. The results were: (7). The percentage of diseased roots grown with dung made from sound and diseased turnips was exactly the same (on the two first plots), indicating that the germs of finger and toe are destroyed in their passage through an animal. (8). The plot receiving dung *with the trough refuse* produced 74 per cent. of diseased turnips, indicating that the spores of the disease may be communicated to healthy land by permitting refuse from diseased turnips to find its way directly into the manure heap. (9). The addition of lime to the dung on the fourth plot practically cured the disease, but also seriously diminished the yield of roots, probably by liberating nitrogen.

[*Report on Distribution of Grants in Aid of Agricultural Education*, 1896-7; C.—8690. *Price* 5½*d.*]

ARGENTINE WOOL TRADE.

In a communication to the State Department at Washington, the American Minister at Buenos Ayres makes the prediction that the probable maximum production of wool has been reached in Argentina. The great increase

which has taken place in the export trade in frozen mutton and live sheep; the increasing attention given to the raising of fat cattle for export, with the consequent neglect of sheep husbandry; the probability that any gain in production of wool in the undeveloped Southern sections of the republic will be off-set by a reduction in the Northern and Central provinces, where the tide of immigration will shortly tend to reduce the area devoted to sheep growing—all, in the Minister's estimation, support the theory that Argentina has reached its maximum as a wool producer. The opening of the land to agriculture will, he thinks, tend to restrict the area devoted to wool growing in the warmer sections of Argentina, while the great mass of the Italian immigrants now going to that country will, for climatic reasons, prefer the more agreeable temperature of the north of Argentina to the less hospitable climate further south. He says "two-thirds of the immigrants now coming here are Italians. Using our own experience as a guide, it seems probable that these will add but little to the development of sheep husbandry in the far southern portion of the Republic while opportunity is found to settle in the warmer and more closely populated portions of the country, where they are more than reasonably sure to succeed in accumulating a modest competence as a result of their labour upon small farms and in different industries."

In 1896 the Argentine Republic exported 413,000,000 lbs. of wool, 366,000,000 lbs. of which were consigned to Europe, 45,000,000 lbs. going to the United Kingdom.

Formerly the bulk of the exports consisted of *criollo* or merino wool, but a large proportion is now made up of "cross-Lincoln," which is estimated to form about 65 per cent. of the annual clip.

EFFECTS OF FOODS ON MILK AND BUTTER.

Among the experiments conducted by institutions receiving a share of the Parliamentary grant in aid of agricultural education was an investigation carried out by the Highland and Agricultural Society of Scotland into the effect upon

the milk and butter of various kinds of foods usually supplied to cattle. Mr. John Speir, summarising the results of these experiments, the details of which will be found in the "Report on the Distribution of Grants in aid of Agricultural Education, 1896-7" [C.8690], reports as follows :—

Rations with an extremely high albuminoid ratio seem to have a depressing effect on the milk yield, well-mixed foods giving the best results in this respect. Every food, when first given, seems to have more or less effect in increasing or decreasing the percentage of fat in the milk. This effect is, however, transitory, and the milk returns to its normal composition about the end of the fifth week. Brewers' grains in the wet state and in excessive quantity may be an exception to this general statement.

Provided extremes are avoided, the dry matter in the food seems to be the principal controlling factor in the production of milk or increase of live-weight, and is of greater importance than the albuminoid ratio.

The fat in the butter-milk is considerably influenced by the food used, but where the cream was churned at the proper temperature, the churnability of the milk appeared to be less affected by food than the experiments in 1895 seemed to indicate. All other things being equal, each food or combination of foods seems to produce a milk which necessitates the cream from it being churned at a temperature peculiar to itself if the best results are to be obtained.

Soft butters usually contain a proportion of water greater than the average, and if the softness is caused by the foods used, the excess of water cannot be reduced by the ordinary methods of manipulation. Food exerts a very great influence on the melting-point (firmness) of butter, and this characteristic may in hot or cold seasons be used with considerable advantage. Nearly all foods exercise some peculiar effect on the flavour of the butter—most, however, do so very slightly, and may therefore be said to be neutral; but some have a good effect and others a bad effect.

Colour in butter seems to be principally derived from green food, and very little from the concentrated foods. To get the best results, some food should always be used which has

a tendency to increase the flow of milk, combined with limited quantities of other foods the tendencies of which are to increase the fat.

For the production of milk to be consumed fresh, any of the foods experimented with may be used successfully if fed judiciously and in moderate quantity.

If, however, first-class butter is the object, linseed-cake, grains (wet or dry), Paisley meal, and foods containing a large proportion of sugar should be discarded, or reduced to the lowest limits possible.

The principal concentrated foods experimented with having a beneficial effect on the butter are oats, decorticated cotton-cake, beans, and peas.

FRENCH AGRICULTURAL WARRANTS BILL.

The Board have received through the Foreign Office a copy of the Government Bill for the creation of agricultural warrants, recently laid before the French Chamber of Deputies.

The object of the Bill is to enable agriculturists to borrow money upon the security of certain harvested crops. In the preamble it is stated that it would in numerous cases be an advantage to farmers if they could procure money for the proper maintenance of their holdings without having to dispose of their produce in an unfavourable market, as it constantly happens that many of them are obliged to send their produce to market immediately after harvest, without being able to wait until conditions are more favourable. It is proposed, therefore, to create a fresh class of negotiable instruments, called "agricultural warrants," which will enable the farmer to borrow money on the security of certain crops, which he retains on his own premises.

The warrants are to be issued by justices of the peace, upon declaration of the nature, quantity, and value of the produce proposed as security, and the amount of the loan. These particulars are entered in duplicate in a register, from which the counterfoil is detached and given to the lender. This counterfoil, subject to a duty of 50 centimes,

is the negotiable warrant. The farmer is bound to keep the crops pledged in proper condition, and to insure them, on behalf of the lender, until the loan has been repaid. In the case of tenant farmers, the landowner must be apprised of the transaction, and has a right of veto. The holder of the warrant has priority over all other creditors (except the State) in the event of the borrower's being unable to meet his engagements. If the borrower fails to repay the loan, the lender can have the produce sold by public auction without further formalities.

The classes of produce which may be thus pledged are cereals, whether in sheaf or threshed, dried vegetables, animal and vegetable textile materials, oleaginous seeds, wines, cider, spirits, dried silkworm cocoons and cocoons used for reproduction, and cut timber.

AGRICULTURAL INQUIRY IN HUNGARY.

In 1895 an official inquiry of an exhaustive character was undertaken in Hungary, under the direction of the Ministry of Agriculture, with a view to the collation of detailed statistics as to the distribution and utilisation of the cultivated land, and as to the numbers and classes of live stock in the Kingdom. A report has recently been published containing the preliminary results of the inquiry, and from these it appears that the cultivated land of the country was distributed in 1895 as follows:—

	Arable land.	Gardens.	Clover and Grasses.	Vineyards.	Meadows.	Woods and Forests
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Hungary Proper -	29,684,487	927,075	7,068,243	694,095	9,032,996	18,445,786
Fiume - - -	697	64	693	30	389	469
Croatia and Slavonia	3,367,229	136,221	1,098,371	124,495	1,464,489	3,730,425
TOTAL - -	33,052,413	1,063,360	8,167,307	818,620	10,497,874	22,176,680

In connection with this investigation, an attempt was made to ascertain the number of the principal varieties of fruit-trees grown in the kingdom; but, owing to a rumour having been circulated to the effect that the trees were to be enumerated for purposes of taxation, the collectors experi-

enced considerable difficulty in verifying the details furnished, and the statistics cannot be regarded as completely trustworthy. Subject to this qualification, the number of fruit-trees enumerated in Hungary proper was 65,000,000, of which 32,000,000 were plum trees and 14,000,000 apple and pear trees. In Croatia and Slavonia 8,500,000 plum trees and 2,000,000 apple and pear trees were scheduled.

A further branch of the inquiry for which the returns are sufficiently advanced in compilation to permit the publication of the principal results relates to the number of live stock. The previous census of live stock in Hungary proper took place in 1884, and the figures for that year are shown below together with those for 1895 :—

Year.	Cattle.	Horses.	Sheep.	Swine.
1884 - - -	4,879,038	1,748,859	10,594,831	4,803,639
1895 - - -	5,829,018	1,972,448	7,526,686	6,446,573

It will be seen that there is a decrease of over 3,000,000 in the number of sheep, while in cattle and swine there is an increase of 950,000 and 1,643,000 respectively. The number of goats enumerated in 1895 was 286,385, as compared with 270,192 in 1884.

SILT OF RIVERS AS MANURE.

According to a publication recently issued by the Indian Government, the silt of rivers and canals appears to be very generally applied as a manure in India, despite the comparatively small amount of plant food which the matter contains. During the monsoon periods, when the surface wash, whether from hill sides or from more level lands, is so great that clear water is not to be seen, water plays a very remarkable part in many parts of India, in transporting vast quantities of earth of one description or another to lower levels. The deposition of silt by canals is a more regular feature than by rivers, which frequently take the matter away from cultivated lands, except in parts where they flood the country annually, as in Eastern

Bengal and in districts where they are dammed up for irrigation purposes, whereby the fertility of the land is increased. Where tanks are employed as irrigation agents the mud which collects in them is frequently dug out and applied to the land as a fertiliser. Not all the silt carried by rivers is of manurial value, for it appears that in the Hoshiarpur District in the Punjab enormous quantities of sand are brought down from the hills during the monsoon and cover up the good soil.

Exact information on the agricultural value of silt appears to have been almost entirely wanting until the recent completion of experiments by Dr. J. W. Leather, Agricultural Chemist to the Government of India, who, in 1893, commenced to test the manurial value of the silt which is generally carried on to the land by canal water. It was first attempted to carry out the investigation as a field experiment, and fields were accordingly embanked and the canal water run on during the monsoon. A crop was then taken in the following cold weather from this, as also from a contiguous field, to which no canal water was applied during the monsoon. It was found that the amount of silt and its contents of nitrogen and phosphoric acid are but very small during the cold weather, and quite insufficient to replace the plant food taken from the soil by a crop of wheat. On the other hand, it would appear to be certain that the silt carried on to the land during the monsoon period contains very material quantities of these plant foods, and that they are probably fully sufficient to replenish the amounts which are taken from the land by the rice crop.

The results obtained are said to be in agreement with the general practice in regard to rice cultivation in India, where rice lands are rarely manured. They are usually clays, and the water passes from one field to another, removing and depositing silt at the same time. Rice lands may thus be said to annually receive a certain amount of silt from higher levels, and this reason is given as a probable explanation of the fact that these rice lands "can do without manure better than any other sort of lands."

AGRICULTURE IN WESTERN AUSTRALIA.

The Government of Western Australia have recently issued information relating to the condition and resources of the colony. As regards agriculture, it is stated that the industry is as yet almost entirely confined to the south-western division of the country, where there is still a vast area of unoccupied arable land, which will undoubtedly be occupied before the other less accessible districts. The lands of the colony are granted to settlers on various terms, the blocks required for sheep-raising being very much larger than those selected for tillage. Land taken up for pastoral purposes may be held on lease only, and cannot be acquired by any form of conditional purchase. In the south-west division, which is the most fertile, blocks of not less than 3,000 acres may be held on pastoral lease at a yearly rental of £1 per 1,000 acres. In more remote districts the minimum pastoral leasehold is 20,000 acres, and the rent varies from 10s. to 2s. 6d. per 1,000 acres; in the latter case it is raised to 5s. after seven years. The tenant is compelled, under penalty of double rental, to stock the land properly within seven years. In the less accessible districts he can obtain a reduction of rent if he has ten sheep or one head of large stock per 1,000 acres of land. The lessee has no right to the land of his holding, which the Crown can always sell, although compensation is given for improvements effected.

Sheep, horses, and cattle are reported to thrive well throughout Western Australia, especially in the northern districts, which generally yield abundant and nourishing pasture. The extensive areas of the goldfields are being utilised for pasturing the sheep and cattle necessary for the supply of food to the mining population. An attempt is being made, by means of granting leases on advantageous terms, to clean certain districts infested with indigenous plants which are poisonous to live-stock. The agricultural area already mapped out for settlement comprises over a million acres, and as the land is taken up other arable tracts are measured out along the various lines of railway which have been laid through the

agricultural centres. In the districts around Northam and York the soil is well adapted for the cultivation of wheat, and this crop is now grown mainly to produce the chaff required to meet the great demand for loose fodder for the teams on the goldfields. Most of the farmers also grow vegetables and fruit, for which high prices obtain owing to the large demand and the comparatively small local supply. Horticulture is indeed gaining ground in the colony, and the soil is stated to be very suitable for the production of all kinds of apples, pears, peaches, quinces, apricots, etc., as well as most of the smaller fruits which are grown in England. Viticulture is becoming very popular. At the beginning of this year there were 120 vineyards in Western Australia, and the total area now under vines is estimated to exceed 2,000 acres, the production of wine reaching 70,000 gallons annually.

The forests of the colony cover an immense area, and the hardwoods of which the Western Australian forests are composed are in great demand for all purposes where toughness and durability are essential. There are some 40 steam saw-mills at work and short lines of railway connecting them with the coast have been laid down. About 2,000 hands are employed in the industry, and the export of wood is now valued at about £750,000 a year. The right to cut timber from the State forests is granted by the Government, and the regulations to be observed have been drafted with due regard to the good conservation of the forests.

THE SUPPLY OF WOOL IN THE UNITED STATES.

The National Association of Wool Manufacturers of the United States has recently completed its annual estimate of the domestic wool clip, which, *Bradstreet's* states, possesses more than usual interest, owing to the abnormal situation wool now occupies in that country. It is based upon the figures of the Department of Agriculture, giving the number of sheep in each State on April 1, 1897, although it is pointed out that these numbers are in many instances higher than those given by the State authorities,

leading to the conclusion that the annual wool clip, instead of being actually somewhat larger than the estimates, is more likely to be slightly smaller. The estimate for 1897 accounts for the fleeces of 34,784,287 sheep, which is the smallest number reported since 1874. The total product of washed and unwashed wool from these sheep is reckoned at 259,000,000 lbs. (including 40,000,000 lbs. of pulled wool), the average weight of fleece being 6·30 lbs. After allowing 60·1 per cent. for shrinkage, the total product of scoured wool works out to 111,000,000 lbs., including 24,000,000 lbs. of pulled wool.

The returns indicate that a favourable winter, and an increasing tendency to change from merino to mutton sheep, have resulted in a somewhat lighter fleece than usual, the average shrinkage being from 2 to 3 per cent. more than in 1896. The total product is a loss of 13,000,000 lbs., as compared with last year, and of 89,000,000 lbs. as compared with the year 1893, when the clip was a record one.

AN INTER-COLONIAL AGRICULTURAL CONFERENCE IN AUSTRALIA.

The Board have received an official Report of an Inter-Colonial Agricultural Conference, which was held at Sydney during the month of May last, the colonies represented being New South Wales, Victoria, South Australia, and Queensland.

Among the subjects considered at the Conference was the development of the export trade in Australasian produce. In this connection it was resolved that steps should be taken to effect a reduction in over-sea freight charges. It was pointed out that owing to the keen competition for the world's markets it was necessary to embrace every opportunity of exporting Australian goods at the cheapest possible rate, countries such as the Argentine Republic, the United States, and other exporting countries having an advantage over Australia in this respect. Attention was drawn to the fact that the freight charges represented a very important item, and that if the colonies combined, and ascertained what

yearly space would be required, an agreement might be secured with a shipping company for a term of, say, five years, to carry all Australian produce at greatly reduced rates. It was shown that a reduction in freight of 25 per cent. in shipments of frozen produce would, on the basis of the actual exports of meat, butter, fruit, &c., mean a saving to Australia of over £100,000 per annum, exclusive of the New Zealand traffic. This saving would, it was stated, be soon increased, as the trade is capable of rapid expansion.

It was further urged that combined arrangements for ocean freights for produce would ensure regularity in supply, and thus prevent the gluts in the market which now seriously operated against the success of the trade.

The question of Government supervision over the produce exported from the Colonies was also exhaustively discussed. It was pointed out that Canada had practically the command of English markets, as far as colonial cheese is concerned, owing to the strict supervision enforced over the quality of her exports. The representative of Victoria, in urging the introduction of compulsory branding, pointed out that great damage was at present done to the Victorian trade by unbranded butter, packed in boxes similar to those used by the Government, and sent in the same boats as the finest Government branded butter. This inferior quality, realising a low price, brought discredit upon that shipped with the Government brand. In the case of exported fruit, the injury which the trade was likely to suffer was exemplified by the fact that 533 cases which the Government expert refused to pass were shipped to England, and arrived there in such a faulty condition as to seriously injure the reputation of Australian fruit. In the course of discussion it was held to be essential to the preservation of the trade that no produce should be shipped without first undergoing inspection at the hands of the Government experts and receiving a recognised brand.

The Conference, therefore, resolved that a system of inspection and marking of meat should be insisted upon by all the colonies as a guarantee to consumers that it is sound and free from disease; and that the inspection and branding or

dairy produce and other perishable goods, as well as the inspection of the sources of milk supply, should be made compulsory.

Other subjects included improved methods of distribution, the refutation of allegations made in England as regards the export of diseased meat from the Colonies, and the reduction in freight on the importation of live stock.

FOWL FEVER (*Enteritis*).

In a pamphlet issued by the Congested Districts Board for Ireland it is stated that fowl enteritis, commonly known as "Hen Fever," or "Fowl Disease," is a deadly dirt-born disease. The germ of the disease reaches the ground in the droppings of sick birds. It reproduces itself rapidly in dirty pools, puddles, and manure heaps, and thence it is carried about on the feet of passers by, or by animals of the farm. The smallest particle of the droppings of sick fowls may produce thousands of poisonous germs, and it is only by swallowing one of these germs that fowl fever can be produced. Ducks and geese are not liable to this disease, but turkeys and pigeons are, and it affects all ordinary barndoor fowls, irrespective of their breed or of their vigour of constitution.

The first signs of sickness are observable three or four days, not longer, after the disease germs have been swallowed. They are indicated by a tired sickly appearance, staggering walk, ruffled feathers, the comb and wattles sometimes turning black, great thirst, and constant droppings of the consistency and colour of fluid mustard; these last two symptoms are always present, even if the first mentioned are not observable. In severe cases the bird will die within twelve hours after the symptoms appear, but the usual course of the fever occupies three days.

There is no remedy that can be relied on to cure a bird suffering from this disease. The best course is at once to destroy any bird attacked; and as the disease germs are

distributed in the droppings of sick birds, the longer such birds are permitted to live the greater is the risk of spreading the infection.

Although some medicines are stated to have been tried by various poultry keepers with more or less beneficial results, there is not sufficient evidence to show that any of them are thoroughly effective, and it is therefore recommended that every infected bird should be destroyed as soon as possible. The bodies of all birds so destroyed, or of birds which die of the disease, should be burnt, or else buried at least three feet deep. If for any reason it is decided not to kill the sick birds, it is suggested that, immediately any of the above-mentioned symptoms are observed, the infected birds should be isolated and confined in a place from which they cannot escape, and fed with bread and milk, or a raw egg beaten up in milk, and if possible with plenty of barley water.

The fowl-house or out-house used by the poultry should be thoroughly cleansed, the flooring dusted with quicklime, and the walls and roosts white-washed. The manure should also be removed daily from under the roosts, and burnt while the disease lasts.

Poultry-keepers are further recommended to carefully scrape the parts of the yard, runs, or other places that may be contaminated by diseased droppings, and scatter lime freely over such places. When possible the surface should be turned over with a fork or spade before liming, and the same precautions should be taken with respect to the banks of the stream, pond, or ditch at which the birds are accustomed to drink. This is said to be a most important precaution.

The pamphlet mentions the following as preventive measures, which should always be in force:—

Keep the fowl-house and the yard or run clean and well drained, so as to be as free as possible from stagnant moisture, and occasionally disinfect with quicklime.

Do not throw the food for the fowls on the ground, but give it in covered troughs or in any suitable vessel into which the fowls cannot place their feet.

Do not feed the fowls close to the dwelling house. Give the food preferably in the fields, and frequently change the feeding place.

Hunt the fowls away from the dwelling house, and try to stop them picking about the yard and manure heaps.

When there is not a pure stream of water, supply fowls daily with fresh water, which should be placed in the shade in a vessel into which they cannot get their feet.

Bear in mind that the germs of the disease are easily carried from an infected farm on the soles of the boots and feet.

Observe that fowl-enteritis is almost invariably produced in dirty surroundings, and that it can best be avoided by cleanliness and disinfection.

The above preventive measures will guard not only against enteritis, but also against other zymotic (infectious) diseases to which poultry are liable chiefly roup, gapes, tuberculosis, and diseases of the comb and skin.

They will also improve the general condition of fowls and will increase their market value.

AGRICULTURE IN BUENOS AYRES.

The Board have received from the Argentine Ministry of the Interior a copy of a report relating to the agriculture, cattle-breeding, and commerce of the Province of Buenos Ayres during the year 1895. This publication, which has been prepared by the Director General of Statistics, gives very full details on the various subjects in question, and it contains a large number of coloured diagrammatic charts, in illustration of the natural and other features of the region. The soil of the province is said to be the best and most fertile in the country and to show no sign of exhaustion, even after three centuries of cultivation.

The importance of the wheat crop in Argentina is very fully explained. The wheat export trade commenced as recently as 1876, and it increased by leaps and bounds until the Republic has attained the third rank among wheat exporting countries of the world. The area under this crop in the province of Buenos Ayres was 220,000 acres in 1881, and it had increased to 990,000 acres in 1895. The Northern portion is best adapted for the growth of wheat, and it yields proportionally three times more than the other parts of the province. Of the principal varieties sown, five are mentioned, of which one, named Barletta, seems destined to supplant the others on account of certain advantages which it possesses as regards its contents of gluten. The general adoption of this variety would moreover produce a degree of uniformity which does not now exist in Argentine wheat.

The climate and rainfall of the province adapt it most suitably for the cultivation of maize, the export trade in which commenced earlier than in the case of wheat, and it exceeded

760,000 tons in 1895. The area under this crop rose from 400,000 acres in 1881, to 1,800,000 acres in 1895, and a further gradual increase is expected owing to the employment of this grain for feeding the ever increasing herds of cattle on the *estancias*. Barley is grown in the province to a small extent only; in 1895 the acreage under this crop was only 75,000 acres, and the quantity exported did not reach 9,000 tons. Flax is cultivated specially for the production of linseed oil, and is raised almost exclusively in the northern part of the province.

The permanent pasture throughout the Republic is very rich, and a sufficient amount of hay could be produced not only for home requirements, but also to yield a lucrative article of export at a very small outlay. It is nevertheless found more remunerative to grow lucerne, inasmuch as this yields four or even more crops annually. In 1895 the area under lucerne in the province was half a million acres, and 70,000 tons were exported principally to Brazil and the United States. It was estimated that the total yield of the crop exceeded two and a-half million tons.

When the Spaniards colonized Argentina, the llama and the alpaca were the only domesticated animals in the country, and horses, cows, and sheep were successively introduced. It is estimated that there now are about 25 million cattle in the Republic, whence over 400,000 were exported alive in 1895. The province of Buenos Ayres alone contained 7,205,000 in 1895, as compared with 8,755,000 in 1890. The diminution, which is attributed to various causes, was observed in the various breeds without exception. The dairy cows numbered 371,000, and the development of an export trade in butter is very hopefully mentioned. About a quarter of a million bullocks are used as draught animals.

It is supposed that there are five million horses in Argentina. Despite the steps taken to introduce the best blood into the country, the horse-breeding industry would appear to have been neglected as regards the improvement of the native breed—swift and hardy animals which can be usefully employed for crossing purposes.

The Argentine Republic is, after Australia, the largest

sheep owner in the world, and in the province of Buenos Ayres alone there were over 50 million sheep in 1895. The total exports amounted in that year to 430,000 live sheep, 40,000 tons of frozen carcases, 200,000 tons of wool, and 33,000 tons of sheep skins. At the beginning of the century the first lot of merinos was imported, and many other consignments followed. Several types of the breed were tried with the intention of obtaining a variety yielding the greatest amount of wool and of meat. It was not until 1856 that English breeds were imported, and since then, Lincoln, Leicester, and Romney Marsh rams have been employed with Merinos to produce the existing Argentine sheep.

The pig-breeding industry is sufficient for home requirements only. Other minor agricultural industries of the Province of Buenos Ayres include poultry- and ostrich-farming, bee-keeping, and silk-culture. Detailed information is also given on these subjects in the report.

WHEAT IN FRANCE.

In his report on the agriculture and trade of France for 1896, Mr. Austin Lee, commercial attaché to the British Embassy at Paris, points out that the sphere of French agriculture is more extended than in England, inasmuch as it relies for support not only on corn, cattle, and roots, but also on wine, spirit, sugar, silk, vegetables, and the produce of the poultry-yard. Wheat holds the first position among agricultural products in France. In 1896 the acreage under this crop was 17,103,633 acres, nearly double the area devoted to any other cereal—and the yield amounted to 327,000,000 bushels. The average acreage in the period 1871-1885 was 16,943,234 acres, and the yield 274,605,430 bushels; while for 1886-1895 the corresponding figures were 16,997,270 acres and 294,456,891 bushels, giving an average of 17·11 bushels per acre. The average yield per acre in 1895 was 18·84 bushels, and in 1896 it was 20·06 bushels; but this year's crop was estimated not to exceed 15·43 bushels per acre.

With the exception of the past exceptionally bad season, the increasing yield of wheat is stated to be due not only to the great improvement in French agricultural methods, but also to the spread of agricultural education and to the establishment of agricultural syndicates and co-operative societies for the wholesale purchase of fertilisers, for the carrying out of productive enterprises beyond the means of the individual member, and for other purposes.

The importation of wheat into France has shown a remarkable decrease during the past few years. In 1894 the quantity imported was 45,900,000 bushels; in 1895 it was 16,600,000 bushels; and in 1896 it fell again to 5,800,000 bushels. The quantity of wheat imported under the system of "temporary admission" increased from 16,431,278 bushels in 1895 to 20,925,574 bushels in 1896. The "temporary admission" of wheat duty free with a view to its re-exportation as flour is a system of long standing. Up to 1836 the concession to the export trade took the form of a "drawback" paid on the flour leaving the country. In that year the system of "temporary admission" was applied with the proviso that the flour should be exported from the port which it had entered as grain. This condition was removed in 1861, and re-imposed in 1873. The millers appear never to have become reconciled to this restriction upon their trade, as they call it, claiming that a return to the rule of 1861 would go far towards relieving the agricultural crisis; inasmuch as a miller at Marseilles importing wheat at 13 to 14 fr. the quintal (about 220 lbs.) could arrange with another at Dunkirk, paying 18 fr. the quintal, to export the corresponding quantity of flour, and each would find a profit in the transaction. The corn-growers, however, watch jealously any claims made by the millers, and in 1895 they succeeded not only in maintaining existing restrictions, but in abrogating what they considered an unfair privilege. In their turn, the millers agitated against this retrograde step, and an attempt was made by the decree of the 31st December, 1896, to compromise the conflicting claims through the division of the country into five "zones"; grain imported into any port within one of these "zones" being

exportable as flour through any other port of that zone. Still the millers were dissatisfied, and after a delay of six months the "Conseil Supérieur de l'Agriculture" decided, on the 24th May last, to suppress the "zones" and return to the system of 1861. Wheat imported under "temporary admission" is classed under three "types," in accordance with the estimated amount of bran it contains, but the yield of flour is undoubtedly much in excess of the amount allowed for, and a large bounty is thereby given to the millers on the export of flour.

[*Foreign Office Report, No. 2007, Annual Series. Price 1d.*]

DAIRY EXPORTS FROM VICTORIA.

According to a report which the Victorian Department of Agriculture has recently published relative to the dairy export trade during the year 1896, it appears that two dry winters in succession have prevented the Victorian output of butter for the seasons 1895-96 and 1896-97 from reaching anything like the value it would have attained had the climatic conditions proved favourable, inasmuch as the dairy herds are dependent almost exclusively on natural pasture, and when this fodder fails the milk supply shrinks in proportion.

The decline in the exports to countries beyond Australasia in the past two seasons is indicated by the following figures:—

SEASON.	BUTTER EXPORTED.	VALUE.
	Tons.	£
1894-95	11,584½	1,081,243
1895-96	7,733	721,746
1896-97	7,895½	736,913

Drought is represented to be such an important factor in the production of butter that, except for the absence of fodder, it is estimated that the large number of factories and creameries in Victoria could easily treble the output of 1896-97. The evil, however, cannot be remedied, because

droughts occur in Victoria in the regular order of things and the only way to guard against the heavy loss the colony as a whole thereby sustains is said to be by means of artificial fodder.

The Victorian Dairy Expert states that it is not sufficient to send a good quality of butter to the British consumer, but that there must also be regularity in the supply, because fluctuations in the monthly exports cause large buyers in England to seek elsewhere for their supplies, and foreign competitors gain an advantage from which it is difficult afterwards to displace them. Comment is also made upon the irregularity in the arrival of the Victorian consignments in England. The steamers leave Melbourne regularly once a week, but instances are numerous where they have arrived in London in pairs fortnightly, and when two or three boats with large consignments of butter arrive in London at the same time the result is disastrous for the sellers. Large quantities of butter have to be kept on the agents' floors for a week or ten days, deteriorating in quality more or less, according to the weather; whereas, if the arrivals were weekly, there would be immediate sale and distribution before the next arrival.

The shipments of butter from Victoria to other Australian colonies amounted to 1,653 tons in 1895-96, which, added to the 7,733 tons exported to England and other markets, gave a total of 9,386 tons.

Each year there is reported to be an improvement in the direction of greater uniformity in the quality of butter sent to the depôt for export. During the season 1894-95 nearly 20 per cent. of the butter exported did not receive the Government brand. The second quality was unbranded and sold on its merits, while the inferior was branded "pastry." Of the 7,733 tons exported to England and other markets beyond the colonies in 1895-96, 6,815 tons were branded with the Government stamp, 912 tons were of fair quality, but not good enough to be stamped, while only six tons had to be branded "pastry." In the past season, 7,093 tons carried the Government stamp, 800 tons were unbranded, while not more than two tons had to be branded "pastry."

No cheese was exported in 1896-97 on account of the satisfactory prices for butter in England, scarcity of milk in the colony, and the low prices offered for cheese itself. It is not, however, to be assumed that the industry will be abandoned, for it appears that when favourable seasons for the production of milk are experienced, cheese-making will have to be resorted to in order to profitably dispose of the summer supply.

SHEEP BREEDING IN THE FALKLAND ISLANDS.

In the official report on this Colony for 1896 it is stated that during the year 1896 there was a great improvement as regards stock. A large importation of stud rams was made direct from New Zealand, principally for East Falkland. There were also imported 241 animals of the following breeds: 127 Romney Marsh, 112 Lincolns, and 2 English Leicesters. The importers are reported to be thoroughly satisfied with the rams, and if care be taken in the selection of ewes it is hoped that a great improvement of the flocks will result in course of time. Other stock introduced consisted of about 110 horses from Patagonia, one Devon bull, and three Berkshire pigs from England. Two farmers on two of the small islands were sufficiently enterprising to import also from New Zealand a small quantity of cocksfoot grass seed.

There was no exportation of frozen mutton during 1896. An official visited London during the winter months with a view to ascertain whether satisfactory arrangements could be made for the sale of Falkland Islands frozen meat in England. It is not, however, expected that any large quantity will be sent unless there be a considerable rise in prices.

The Report states that at present prices for frozen mutton, it is a question whether boiling down does not pay as well, if not better. To make frozen mutton pay, it is necessary to breed the sheep up to a certain standard. It is not sufficient that the sheep should be large and heavy; quality is the first consideration, and some time must elapse before Falkland Islands sheep reach that standard.

INTERNATIONAL STATISTICAL INSTITUTE.

The sixth meeting of the International Statistical Institute was held in St. Petersburg, on the invitation of the Russian Government, on 30th August to 6th September, 1897, and (including 5 candidates who were duly elected members before the close of the session) the gathering was attended by 46 members of the Institute, representing twelve different nationalities, and by 48 official and other statisticians chiefly belonging to the Russian Imperial Services, who were specially invited, and official delegates appointed by the Governments of Baden, Denmark, France, Great Britain, Italy, Norway, Roumania, and Sweden. The British Board of Trade was represented by Mr. A. E. Bateman, C.M.G., and the Board of Agriculture by Major Craigie. The session was opened by an address from the Grand Duke Constantine, who welcomed the members on behalf of the Emperor, the representatives of the Ministries of the Interior and of Agriculture and Domains joining in the reception. In the absence of the President, Sir Rawson W. Rawson, K.C.M.G., C.B., the meetings were presided over by M. Emile Levasseur, whose opening address described the functions of the Institute in combining the services of trained official experts and of eminent unofficial statisticians.

The work coming before the Institute during the session was in accordance with the practice adopted at Berne, divided into four sections or groups, which, with the presidents they subsequently chose, stood as follows :—

Section I. Methodology, population, justice, and historical statistics. (President: Dr. Von Mayr.)

Section II. Agriculture and landed property. (President: M. Tisserand.)

Section. III. Industry, commerce, colonies, precious metals. (President: Prof. Lexis.)

Section IV. Finance, credit, savings banks, &c. President: M. Millaud.)

Among the subjects dealt with, agricultural questions were on this occasion unusually prominent. At the first meeting of the section on agricultural statistics, attention was drawn to the repeated efforts to collect in one country or another statistics showing the number, size, and distribution of the separate holdings, farms, or undertakings by which the agriculture of each State was conducted; and copies of the returns lately issued by the Board of Agriculture giving the result of a special inquiry into the number, size, and distribution of agricultural holdings in Great Britain in 1895, were laid on the table. On the section of these returns showing the extent to which the land of each holding was occupied by the owner of the soil, or by a tenant, considerable discussion arose, particularly as to the wisdom of recommending a further and general inquiry in all countries respecting the actual distribution of the ownership of land, and Professor Conrad submitted a detailed proposal for such an investigation, which he desired should have regard both to the extent and to the value of each landowner's possession, whether urban or rural. A somewhat similar proposal was submitted to the section by M. Rheinbott. These proposals will be further considered by the standing committee on agricultural statistics.

At the general meeting suggestions were offered by Austrian and Russian members respecting uniform methods of collecting and publishing crop reports and forecasts of harvests. M. Pilat urged the necessity of a careful ascertainment of the areas from which crops were harvested, and recommended the publication by all Governments of provisional forecasts of the chief grain crops at short intervals. M. Timiriasew, of the Russian Ministry of Agriculture, pointed out the want of agreement in the mode of expressing the position and prospects of such crops as were already the subject of official forecasts, and an interesting discussion was provoked, in which M. Tisserand, M. von Mayr, and Prof. Conrad took part, on the methods of the several governments, the last named commending the American forecast system.

Major Craigie submitted also a series of tables showing for what countries an annual record was published of the acreage of cereal crops and of the number of live stock, indicating the numerous instances in which as yet no complete statement year by year was available. He showed that on a thirty years' survey a complete or nearly complete series of *annual* records of the areas of wheat are furnished in only five countries out of twenty—viz., the United Kingdom, her Australian group of Colonies, France, Holland, and the United States of America, from official sources. Next in degree of continuity of record are the annual figures from Austria and from Hungary. From 1878 the German Empire has supplied continuous annual reports, and similar serial data have been more lately begun in some provinces of Canada, in India, Roumania, Sweden, Italy, and Russia. Recent reports from Algeria, and even from Japan, suggested that the example of an annual record of areas may be in future hoped for from regions less statistically familiar. Elsewhere, and in some of the countries named, before the beginning of consecutive statistics, the areas on which wheat was grown were apparently ascertained only by inquiries made at more or less distant intervals. Thus, for Belgium we have no later data than those of 1880. Continuous annual statistics of the number of live stock were, it was also pointed out by means of the tables submitted, available only in a few countries.

The practice of Great Britain and her Australian Colonies as to annual returns was in accord with that of France, Holland, and Sweden in Europe, and with the United States of America only, and the wide gaps in such important live stock owning countries as Russia, Germany, Italy, Austria, and Hungary indicated the danger to the statistician who may be making an estimate of the total herds or flocks of the world at any given date, from the absence of annual particulars.

Apart from the lesson these tables teach as to the value of a strictly consecutive series of international statistics, the agricultural changes of recent years were indicated in definite form by the figures supplied by Major Craigie. These suggested an apparent stationary condition of wheat

areas not only in Europe, but latterly in America. They showed an increase in some, though not in all, countries of cattle, and a very general decrease in the flocks of continental Europe, a decline, which the more recent figures show, extends to the United States. The loss of sheep was happily not so perceptible in the United Kingdom, despite the many tons of mutton it receives from the expanding flocks of Australasia and Argentina.

The Russian communications included notices of varied statistics from nearly 5,000,000 households locally collected by the Zemstvos, or local councils, and respecting the many changes which were becoming evident in the condition of the Russian peasantry. Special attention was drawn to the statistics of sales of land in a single year in Russia, which showed that in twelve months 5,646,000 acres had been sold by the nobles, and only about half that area repurchased, something like 2,700,000 acres thus passing out of the nobles' hands into those of peasants of various grades, co-operative associations of peasants and local communes, or purchasers of the merchant class.

It was pointed out in the discussion on Russian agricultural conditions that the patriarchal customs of rural life were disappearing. Formerly nearly all the population of the villages devoted themselves to agriculture; now factories and mills were springing up, and the rapid growth of certain towns was evidenced by the figures of the census. The old three course system of rotation was being abandoned around Moscow, and fodder plants were being cultivated. Better implements were in demand, and in the south the upper class of peasants now rarely dispensed with threshing and reaping machines, and where the peasants were unable to purchase these individually, they were co-operating in groups for the purpose. Changes were occurring in the distribution of landed property, and in common lands, as where the land of the *mir* was now apportioned according to the number of mouths in the parish. Alongside of the communal possessions, free associations were being formed to buy or lease farm lands. The old equality of fortune distinguishing the earlier rural life was passing into the sphere of legend.

Although only agricultural subjects have been so far noticed here, the Institute had before it various proposals for a synchronous census of the different States of the world in 1900, and much interest was felt in the account given by M. Troïnitsky, of the carrying out of the general Russian census of January, 1897, which showed the population of the empire to have risen to 129,000,000, with however a remarkable variation in density from 1 person per square mile in Siberia to 192 per square mile in Poland.

Various papers were read on the possibility of statistical comparison between the criminal and judicial records of different States, Mr. Bateman laid a useful series of tables before the Institute showing, in a convenient form, the different methods of classifying and recording import and export statistics in various countries; the varying practice of many States in indicating in their trade accounts the country of actual origin or merely the country of immediate shipment; the diverse method of quoting the values of the external trade; and the differently grouped categories or classes into which the official records of that trade were divided. He pointed out that these differences are too often overlooked when attempts are made on the basis of the published statistics to exhibit the growth or decline of production, exportation, or manufacture in different parts of the world.

RUSSIAN CUSTOMS TARIFF ON AGRICULTURAL MACHINERY.

In the Report on the Trade and Agriculture of St. Petersburg for 1896, Mr. Consul-General Michell states that a committee was appointed in June last by the Minister of Finance to examine the question of the duties with which all agricultural machinery and implements are charged on importation into Russia, the reduction or total abolition of which is so much desired by the majority of landed proprietors. This committee held several sittings, and examined many witnesses on the subject. As was to be expected, the greatest opposition to any modification or complete removal of the existing duties was displayed by native manufacturers,

who urged the necessity of retaining the existing highly protective rates, the main argument used by them being that it was absolutely necessary to continue the protection now afforded them under the customs tariff in order that the manufacture of agricultural machinery and implements should become firmly established in the country.

The decision of the Minister of Finance has not yet been made known, but it is thought that it will be in accordance with the declaration of the chairman, at the final sitting of the committee, to the effect that he would recommend the entire abolition of duty on some machines and implements, the reduction of duty on others, and the free importation into Russia during the course of the next five years of certain machines not made in the country, such as sheaf binders, steam ploughs without engines, compound threshing machines, hay scatterers, sorters with spiral cylinders, potato sorters, cream separators, brick-making machines, manure spreaders, horse rakes, etc.; and further, that agricultural machines and implements newly invented and adopted in use abroad, be also allowed to be imported free of duty into Russia during the next five years. It is expected that this question will be disposed of by legislation by the Council of the Empire by January 1, 1898.

During each of the last three years the value of the agricultural machinery imported into Russia has averaged considerably over half a million, being no less than £588,000 in 1895, and £573,000 in 1896, exclusive of agricultural implements; including the latter class of goods, the importation from the United Kingdom amounted to £168,000 in 1895, while in 1894 it was £237,000.

[*Foreign Office Report, Annual Series, No.* 1998. *Price* 4½*d.*]

THE LOCOMOTIVES ON HIGHWAYS ACT, 1896.

The twenty-sixth annual Report of the Local Government Board states that this Act, which came into operation on the 14th November, 1896, exempts certain light locomotives from some of the restrictions contained in previous Acts on the

use of locomotives on highways. The light locomotives to which the exemption applies are described in the Act as vehicles propelled by mechanical power if under three tons in weight unladen, and not used for the purpose of drawing more than one vehicle (such vehicle with its locomotive not to exceed in weight unladen four tons), and so constructed that no smoke or visible vapour is emitted therefrom, except from any temporary or accidental cause.

The council of a county or county borough are empowered by the Act to make bye-laws preventing or restricting the use of light locomotives upon any bridge within their area, where they are satisfied that such use would be attended with damage to the bridge or danger to the public.

The provisions of the Act for the most part relate only to light locomotives as above described, but section 9 applies to other locomotives on roads, and enables the Local Government Board to vary the requirements of sub-section 4 of section 28 of the Highways and Locomotives (Amendment) Act, 1878, with reference to the driving wheels of locomotives.

Under section 6 of the Act the Local Government Board are empowered to make regulations with respect to the use of light locomotives on highways, and their construction and the conditions under which they may be used. Section 4 of the Act limits the speed at which a light locomotive may travel over a public highway to 14 miles an hour, or such less speed as may be prescribed by regulation, and under section 7 a person in charge of a light locomotive is required to carry attached thereto a lamp so constructed and placed as to exhibit a light, in accordance with the regulations which came into force on the 14th November, 1896.

The amount received in respect of licences for light locomotives on highways amounted to £48 during the year 1896-97, the licences being levied under section 8 of the above-mentioned Act, which provides that on and after the 1st January, 1897, there shall be granted, charged, and paid for every light locomotive which is liable to duty as a carriage, or a hackney carriage, under section 4 of the Customs and Inland Revenue Act, 1888, an additional duty

of excise of £2 2s. if the weight of the locomotive unladen is between one and two tons, and of £3 3s. if the weight exceeds two tons. The duties are dealt with in the same way as the duties on local taxation licences under the Local Government Act, 1888.

RAIFFEISEN BANKS IN AUSTRIA.

The Imperial Central Statistical Commission of Austria has recently published detailed statistics concerning the progress of the Raiffeisen banks in that country. It appears that in the majority of the Austrian territories there is a constant, and in some cases rapid, increase in these associations. Their number has increased from two in 1886 to 1,018 in 1895. At the end of 1895 the Raiffeisen associations already represented 37·9 per cent. of the whole number of registered loan societies, and in particular provinces they were considerably more than half. The number of members has risen within ten years from 54 to 56,138; the loans advanced by the banks attained at the end of 1894 the total of £633,061, while the total capital standing to the credit of the association was £1,131,517. The assets of the Raiffeisen banks amounted at the same period to £1,148,250; the most important item in this sum being always the outstanding loans.

The loans are generally, in the practice of the Austrian Raiffeisen banks, assured upon personal security, and only rarely upon mortgages. According to the sample regulations prepared by the provincial authorities, especially in the Lower Austrian model, such mortgages are, it is true, admitted in principle, but they are rare in practice. Only three societies grant loans on mortgage for long periods. The Lower Austrian Land Committee was from the first opposed to them because the Raiffeisen banks did not dispose either of sufficient means or of an adequate staff to be able to successfully carry on mortgage transactions, which require special knowledge and experience. On the other hand, mortgage loans were for some time not uncommon in the

Tyrol, but it has recently been resolved to greatly restrict the practice in this district also.

The formation of reserve funds naturally progresses slowly, from the nature of these banks, of which the immediate object is a reduction in the rate of interest, and not the accumulation of a large surplus. In 1894 no less than 373 societies (36·7 per cent. of the whole number) were without a reserve fund; in which connection it should, however, be remarked that the numerous new societies opened during the year could evidently have no reserve.

GRANARIES IN PRUSSIA.

Allusion was made last year in this Journal (Vol. III., p. 53) to a proposal to grant State aid for the construction of grain depôts in Prussia, and the Board have now received through the Foreign Office a memorandum, prepared by Mr. W. Harries Gastrell, relating to this subject.

Mr. Gastrell states that the question of constructing granaries in Germany with the aid of the State, to facilitate storage in the interest of agriculturists, first became prominent in 1895, when the project was much discussed and advocated. The Minister of Agriculture stated in the House of Deputies in April, 1895, that it was not silos, but granaries, that were required, that the Government had considered the case, and that an experiment in the direction of constructing such buildings would be made.

The idea of the landowners was to endeavour to obtain a more direct trade with the consumers. It was represented that, owing to the lack of such granaries in the hands of associations of landowners, the growers were often compelled to sell their corn immediately after harvest at unfavourable rates, instead of being able to wait for better prices. On the other hand it was urged that such associations had not proved successful in speculative transactions; and that, if they confined their operations merely to the storage of each member's grain, it was doubtful whether the profit would balance the cost of erecting the store-houses. It has also been contended

that the intervention of the State in aid of these buildings might call into existence enterprises which were not economically sound, and, moreover, that it would be unfair to dealers in grain; whereas other branches of the grain business might be equally entitled to participate in the benefits conferred.

In the spring of 1895, the Baden Government appears to have helped to establish a society which confined itself to cleaning the corn stored in the granary, and to selling it through the managing committee within fourteen days. Another association at Worms sells only upon the order of the owner.

The first Government subsidy in aid of storehouses for grain was granted by a law of 3rd June, 1896, which devoted £150,000 to this purpose. By a further law of June 8th of the present year a second sum of £100,000 has been placed at the disposal of the Government for this object in connection with the simultaneous grant of £3,370,800 to complete the railway system of Germany. The total amount voted by this latter law is thus £3,470,800, apportioned as follows :—

	£
I. (*a*) Branch Lines - - - - - - - -	2,671,400
(*b*) Traffic Requisites, Rolling Stock, etc. - - -	299,400
II. In aid of construction of light railways - - -	400,000
III. In aid of erection of grain store-houses - - -	100,000
Total - - - - - - - - -	3,470,800

The Government had already granted, in aid of light railways, a sum of £250,000 in 1895, and £400,000 in 1896, bringing the total, with this year's grant, to £1,050,000. The law gives no indication as to whether the granaries erected with the aid of the present £100,000 grant may be on or near the light railways, nor is any definite information available on this point.

In the preface to this year's Bill granting the £100,000 in aid of these store-houses, it is stated that agriculturists are now paying more attention to the question of the erection of grain store-houses, and that it is only in Schleswig-Holstein, the Rhenish provinces, Silesia, Posen, and Brandenburg, that reluctance to adopt them has been exhibited. Subsidies for the purpose appear to have been already granted to the Chief

Association of Pomeranian agriculturists (£50,000), similar societies at Halle (£18,000), Pelphin in West Prussia (£3,750), and Janowitz in Posen (£3,350). Requests for further grants, amounting to about £81,000, have also been received from Saxony, East Prussia, Pomerania, &c.

Attention has recently been called in the public press to the fact that the managers of the Halle store-houses had drawn up regulations, fixing the minimum quantity of grain which could be stored there. It was pointed out that this minimum would exclude the small farmers from participation in the benefits conferred by these store-houses, and the comment was made that the money given by the State should be so spent as to place the advantages of the system within the reach of all persons on whose special behalf the subsidies are paid.

AGRICULTURAL HOLDINGS IN NEW SOUTH WALES.

In a work recently issued by the Government Statistician of New South Wales, it is stated that, excluding land held by the tenants of the Crown, there were in the colony, at the end of March, 1896, 60,529 holdings of one acre and upwards in extent. Twenty years previously such holdings numbered 36,984. The increase in number amounted during the period to 64 per cent., while the area comprised in the holdings advanced from 13,525,497 to 42,321,926 acres, or 213 per cent. The average area of holdings sold gradually rose from 366 acres in 1876 to 770 acres in 1883; between 1884 and 1892 this average increased very little, while in 1893 the figures took a downward movement, falling to 699 acres in 1896, the lowest average since 1881. This decline in the average area is due to the increase in the number of small holdings, the advance in this respect during the last four years being nearly as great as that made during the previous eight years. Settlement in New South Wales has hitherto tended towards the concentration into comparatively few hands of the lands sold to a large number of individual selectors, and in the great majority of cases the

owner of the land is also the occupier. Tenancy, as understood in older settled communities, has made comparatively little progress, 90·55 per cent. of the land alienated being yet in the occupancy of the proprietors themselves, or an area of 38,320,961 acres, whilst only 4,000,965 acres, or 9·45 per cent., are held under lease from the freeholders.

The number of persons reported as employed in agricultural and dairy-farming pursuits during the year ended March, 1896, was 86,772, of whom 15,298 were females. Of the total number 59,838 males and 4,203 females were engaged in purely farming operations, whilst the dairy-farming industry gave employment to 11,636 males and 11,095 females. If to these be added 31,930 persons engaged in pastoral pursuits, it is estimated that rural occupations absorb the energies of 118,702 persons. The number given as engaged in dairy-farming does not include 338 hands employed in town factories.

The average area to each person engaged in rural pursuits is 1,332 acres, ranging from 54 acres in the metropolitan county to 12,684 acres in the western plains. Apart from the metropolitan district, which contains numerous orchards and market gardens, the South Coast districts surpass all the others with one person to every 135 acres, followed by the Hunter River District with one to every 185 acres, and the North Coast with one to every 230 acres.

[*The Wealth and Progress of New South Wales*, 1896.]

Sugar Beet in Australia.

The cultivation of sugar beet is attracting a good deal of attention both in Victoria and in New South Wales. In Victoria the Department of Agriculture has lately made some careful analyses of different varieties of locally-grown beets, with the most satisfactory results. A good beet should show not less than 12·5 per cent. of sugar, but those tested by the Department yielded from 14·16 to 15·61 per cent. The Government of the colony have passed an Act under which

the Treasurer is empowered to advance loans on easy terms for the purpose of establishing mills for the production of sugar from beets. The results of the tests made in Victoria have, however, been greatly exceeded by those furnished by analyses of beets grown in the Tenterfield district of New South Wales. The chemist of the Colonial Sugar Refining Company, at the request of a local beet-grower, made a series of tests, the yield per root from those analysed ranging from 15·66 up to 24·75 per cent. Experts pronounce such yields to be remarkable; and there is a movement in favour of testing this branch of agriculture in those districts unsuited to the growth of the cane, special attention being directed to the matter in the Tenterfield district, where the project has taken practical shape. Should the cultivation of the beet for sugar production fulfil but half the expectations of its advocates, there is said to be little doubt that it will greatly modify agriculture in the colony, and add another profitable staple to its resources.

[*The Wealth and Progress of New South Wales*, 1896.]

Mildew of Vines.

Vines affected with mildew may be dusted with pure "flowers" of sulphur, the application being made with small bellows to both sides of the leaves in the morning. Should the grapes be formed and it is seen that the sulphur remains upon them they should be syringed with water after six days. If the vinery is heated, the pipes may be brushed over with sulphur mixed with water, or, in preference, milk; the fumes evolved will act, as in the dusting process, as a deterrent against mildew. Sulphuring should be repeated at intervals of from ten to fourteen days until the disease disappears. Attention should be given to the drainage of borders, which should also be carefully watered. Sudden and sharp variations of temperature should be avoided, as well as draughts and a cold over-moist atmosphere.

Fruit Growing in British Columbia.

Nearly every section of British Columbia is stated, in the last report of the Agricultural Department of that Province, to be well adapted for the growing of fruit, both large and small, and settlers generally are planting out orchards, many of which are already in good condition and bearing largely. The conditions most unfavourable to fruit are the prevalence of insect pests and diseases due to cultivation and the importation of foreign products, both nursery-stock and fruit. The industry moreover, except in individual cases, has not been carried on with much system or knowledge of fruit growing. Trees have been purchased somewhat indiscriminately from agents, regardless of experience as to the best and most suitable varieties, with the result that there is a great mixture of fruits, and not much of first quality. Little attention has been devoted to methods of planting, pruning, and general cultivation, so that existing orchards do not fully represent the capabilities of any district. Lack of railway communication, remoteness of settlers from each other, and the difficulties incident to the proper preparation, planting, and keeping of an orchard, have also prevented the success of the industry, but these difficulties are being gradually obviated or overcome. The efforts of the Department of Agriculture and the Fruit Growers' Association have succeeded in imparting a better knowledge of the development of the industry in the Province, which is expected in the near future to become a large producer of good fruit.

Dairy Trade of New Zealand.

The exports of dairy products from New Zealand during the twelve months ending with June 30th, 1897, greatly exceeded those of any previous year. The outward shipments of butter amounted to 88,683 cwts., of the value of £357,187; an increase, compared with 1895-96, of 26,738 cwts. in quantity, and £106,302 in value, of which 86 per cent. was credited to producers in the North Islands. The total amount of cheese exported in 1896-97 was 78,384 cwts.,

of the value of £151,298; 54 per cent. of which was produced in the South Island. In 1895-96 the exports of this article amounted to 67,272 cwts., valued at £121,993. An increase was reported in the number of dairy factories and creameries in operation in September of the present year, the total being 318 compared with 283 in 1896, and 223 in the previous year. The number of factories was 184 against 137 in 1895, whilst the number of creameries had increased from 86 to 134. Two-thirds of these establishments are situated in North Island, the number in the South Island being only 104.

Western Australian Agricultural Statistics.

The Board have received from the Government of Western Australia a copy of the abstract of the Agricultural and Live Stock Returns of the Colony for the year 1896-97. At the close of the agricultural year on the 28th February last, the total area under crops amounted to 111,738 acres (the corresponding figure in 1887 was 66,163 acres) and if there be added 4,000 acres under permanent artificially sown grasses, 25,000 acres cleared and prepared for immediate use, and 23,000 acres of land in fallow, the total arable area was 163,000 acres. The principal crops were represented as follows:—Hay of all kinds, 69,000 acres; wheat, 31,000 acres; barley, 1,903 acres; oats, 1,753 acres; vines, 2,294 acres; orchards and gardens, 2,393 acres. The live stock returns were collected on the 31st December, 1896, and gave the following results:—57,527 horses, 199,793 cattle, of which nearly 35,000 were calves under one year old; 31,154 pigs, 2,248,976 sheep and lambs, 3,984 camels, 104 donkeys and mules, and 4,027 goats.

A Co-operative Dairy in Flanders.

One of the most successful co-operative dairies in Belgium is situated at Oostcamp-les-Bruges, and has been in operation since the year 1886. The butter from this farm has sold at an average price of 1*s.* 0½*d.* per pound during the present year. The profits are divided as follows: One half to the shareholders, who hold one share

for each cow they possess; one quarter is applied to the paying off of capital, 15 per cent. is put by as a reserve fund, and the remainder is distributed as a bonus among the employés. The price received by the shareholders for milk averaged $3\frac{1}{2}d.$ per gallon; but with the proportion of profit received, it amounted to about $4d.$ The separated milk returned is assumed to be worth $1\frac{3}{4}d.$, so that the milk may be said to give a return of about $5\frac{3}{4}d.$ per gallon.

Margarine in Norway.

Consul-General Dundas reports that the manufacture of margarine has made great progress in Norway, and that the number of factories has doubled during the last five years. Of the thirteen factories, which give employment to two or three hundred men, four (employing 120 hands) are situated in Christiania. The quantity of margarine exported from Norway in 1896 was 2,523 tons, of the value of £112,167 (against 1,800 tons and £90,880 in 1895), of which over 1,400 tons went to Sweden, 550 to Denmark, and 434 to the United Kingdom.

[*Foreign Office Report, Annual Series, No.* 2013. *Price* $2\frac{1}{2}d.$]

German Agricultural Co-operative Societies

According to a recent number of the *Landwirthschaftliche Jahrbücher* the Agricultural Co-operative Associations existing in the German Empire on July 1st, 1896, numbered 9,010, comprising 6,391 credit societies or rural banks; 905 associations for the purchase of manures and other farming requisites; 1,397 co-operative dairies; and 307 associations for various other purposes. In 1891 the number of Agricultural Co-operative Societies of all kinds in Germany was 3,625; thus in the interval between 1891 and 1896 there has been an increase of about 5,400 in the number of these institutions. This development is largely due to the establishment during the past five years of over 4,000 new credit banks in various parts of the country.

Co-operative Farming in the United Kingdom.

From statistics collected by the Co-operative Union, it appears that the returns furnished by forty Co-operative Farming Societies in the United Kingdom show that 4,869 acres were farmed by such societies in 1896; of these 1,532 acres were in Scotland and the remainder in England. Of the total area, 3,628 acres were farmed by thirty-six associations of consumers, eight of which owned the land, the remaining twenty-eight paying rent amounting to £5,231. Farms covering 1,241 acres were farmed by four special associations, paying a total rental of £1,983. Nineteen of the associations of consumers reported profits on their farms amounting in all to £2,993; twelve incurred losses amounting to £3,709, of which sum £2,280 was lost by one society. Two of the four special farming associations showed profits amounting to £309, and the remaining two incurred losses to the amount of £142. Societies farming less than ten acres are not included in these statistics.

Sales of Seeds and Manures in Ireland.

According to the report of the Congested Districts Board, Ireland, for 1895-96, the sale of seeds and manures through special agents of the Board was continued during that year to small farmers in districts where a difficulty is experienced in procuring supplies of good quality. The total value of seeds and manures thus sold amounted to £1,034, of which sum only £13 10s. was expended on grass, clover, turnip, and mangold seeds, the remainder of the amount being spent on seed-oats and artificial manures. The seeds and manures were sold for cash at prices which covered all expenses of purchase, freight, storage, etc.; but there was a slight loss, as some local agents over-estimated the quantity of seed-oats and other seeds that would be purchased in their districts by small occupiers. Almost the entire supply of seed-oats was purchased

in Scotland, but the remaining seeds and artificial manures were purchased in Ireland.

The provision of even a small supply of good seeds and manures is a very great benefit to small occupiers in remote parts of the country, where good fresh seed can hardly ever be procured, and where good artificial manure is equally rare. Where inferior manures have been sold the action of the Board will probably cause traders to sell manure of better quality and at more reasonable prices than have hitherto been charged. The Board supply each purchaser of manure from them with an invoice setting forth the guaranteed minimum percentage of nitrogen, of soluble and insoluble phosphates, and of potash contained in the manures sold.

Poultry-Rearing and Bee-Keeping in Ireland.

In the last report of the Congested Districts Board for Ireland it is stated that during 1895-96 the number of the Board's poultry farms for the distribution of the eggs of pure-bred fowls was increased from thirty to fifty-two. In most instances birds of the Minorca and Plymouth Rock breeds are supplied, the former where fowl are kept wholly or mainly for egg-laying, and the latter where a breed is wanted that is fairly good both for laying and for the table. The number of eggs given out from the poultry farms during the year was very greatly in excess of the number distributed in the previous year. A poultry-fattening establishment having been started in Killarney, the Board supplied a large number of birds of breeds considered suitable for the production of chickens for cramming to persons living in neighbouring congested districts. Grants to the value of about £190 have been made to the Sisters of Mercy at Claremorris and Swineford to assist in providing (for educational purposes) fowl, poultry-houses, runs, and other appliances for rearing and fattening poultry.

In accordance with arrangements entered into by the Board with the Irish Bee-Keepers' Association, an expert

visited numerous places in the congested districts to afford information to those who might wish to procure bees, and to give advice and instruction to such bee-keepers as might wish to avail themselves of his help. Forty-four hives of the pattern approved of by the Irish Bee-Keepers' Association, with suitable outfits and appliances, were supplied at cost price during the year upon favourable terms of deferred payment.

Live Stock in Queensland.

The Report of the chief Inspector of Stock for the year 1896 indicates that on the 31st December last the number of sheep in Queensland was 19,593,696, showing a decrease compared with the previous year of 263,263 animals, or 1·3 per cent. Cattle numbered 6,507,377, or a decrease during the year of 315,024, equal to 4·6 per cent. There were imported into Queensland by sea 64 head of cattle for breeding, and 10,063 animals were imported overland. The numbers exported were 575 by sea, and 272,047 by land. The value of these imports and exports was £43,861 and £573,087 respectively.

Forestry Legislation in the United States.

Under an Act dated 31st March, 1891, seventeen separate forest "reservations," covering a total area of 17½ million acres, had been established in the United States prior to the year 1894. With a view to devise some adequate system of production and management, an inquiry was instituted in 1896 to investigate and report upon "the inauguration of a rational system of forest policy for the forested lands of the United States." A report which recommended the creation of thirteen additional reserves, of an area exceeding 21 million acres, was adopted, and the reserves were proclaimed on the 22nd February, 1897. A Bill passed on the 4th June last made an appropriation of

£30,000 for the survey of the districts, and the enactment is officially declared to embody the most important forestry legislation hitherto passed by Congress. The intention is, briefly, to improve and protect the forests within the reservations, to secure favourable conditions of water flow, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States.

Hop Drying Temperatures.

A series of hourly readings of the temperature of the kiln or oast in which hops are dried was taken last year in three oasts in different parts of the county of Kent, and also in the oast at the South Eastern Agricultural College, Wye. Most divergent opinions have hitherto circulated as to the temperature that prevails during the process, but this diversity is largely due to the position of the thermometer. After many trials it was found necessary to use two thermometers, one above and one below the layer of hops; they were generally placed opposite the door and about a yard from the side of the oast. The results obtained showed that in a good drying the thermometer below the hops rises rapidly, the thermometer above remaining nearly stationary at about 80 degs. Fahr. After about 6 hours, when the lower thermometer shows 140 degs. to 160 degs. Fahr., the upper thermometer begins to rise and the lower to fall, the two temperatures approximate an hour or two before the end of the drying, and remain together to the close. The records of several dryings that resulted in spoilt hops never showed the sharply contrasting rise and fall of the two thermometers, the lower one rose slowly and fell again, and never reached the temperatures recorded in the other cases. The fact that well-dried hops can be exposed to a temperature of 150 degs. Fahr. had never been realised before.

[*Report on Distribution of Grants in aid of Agricultural Education*, 1896-97. *C.* 8690.]

Agriculture in Alaska.

According to *Bradstreet's*, experts appointed by the United States Government have been for some months investigating the agricultural possibilities of Alaska, particularly in the southern coast region, and they have submitted reports upon the matter to the Secretary of Agriculture. The reports agree that while comparatively little agriculture is carried on at present in the territory, it is possible that enough of certain crops and animals may be grown to sustain a considerable population provided proper methods are pursued. The establishment of agricultural experiment stations is not regarded as feasible, but it is believed that experiments may be carried on in various directions with success. Cultivated areas in Alaska are confined to small kitchen gardens, in which are grown many of the earlier and hardier vegetables, and stock-raising is carried on to a very limited extent, but the possible extension of the pasturage and gardening area is quite considerable. Agriculture in Alaska will, however probably always be subsidiary to fishing and other industries.

REPORTS ON FOREIGN CROPS.

Crops in the United States.

The October and November reports of the Statistician of the Department of Agriculture of the United States contain the preliminary estimates of the results of the past harvest in that country. The quantities are shown in Winchester bushels. With regard, however, to the wheat crop, the estimated yield is withheld pending the result of an investigation into the acreage and production of that cereal in the United States, which is now approaching completion.*

The preliminary estimate of the yield per acre of oats was 28·1 bushels on an estimated acreage of 25,719,000 acres. This would indicate a total yield of 722,704,000 bushels, compared with a production of 707,346,000 bushels in 1896. The final estimate of the yield of oats per acre last year was 25·7 bushels.

The preliminary returns show an average yield per acre of rye of 16·1 bushels, or a total estimated production of 27,418,000 bushels, as compared with 24,369,000 bushels in 1896.

With regard to barley, the crop is estimated to produce 66,665,000 bushels, being an average of 24·5 bushels on an acreage of 2,721,000 acres. The final yield last year was put at 69,695,000 bushels.

Maize is not expected to reach the high figure of 1896, but is returned as yielding 23·7 bushels per acre, which is 3·6 bushels less than last year.

Potatoes have yielded 64·6 bushels against 86·8 in 1896.

* In a late report issued by the United States Department of Agriculture on December 13th it is stated that the special investigation instituted by the Department indicates a wheat crop of 530,000,000 bushels.

The average quality was returned in November at 81·3, which shows a considerable recovery from the October report, when it was placed at 61·6.

The hay crop is above the average, being the highest of the last five years. The yield is estimated 1·42 tons per acre.

With regard to apples, in the month of October it was stated that there were few localities from which the reports did not show a further decline, and even where the crops are otherwise favourable the fruit is generally undersized, and in many cases of inferior quality.

CROPS IN RUSSIA.

According to a despatch from Mr. Michell, Her Majesty's Consul General at St. Petersburg, the Section of Rural Economy and Statistics of the Ministry of Agriculture has issued a Report, founded on communications received from 6,700 private correspondents from different parts of the Empire, on the approximate yield of the harvest of 1897.

The general deductions arrived at are that the yield of the principal cereals in European Russia was a bad one. The rye and wheat crops gave poor returns in the greater part of the black-soil provinces, this being the case even in those districts which are generally favoured by the most abundant harvests. The localities in which the yields were lowest, and in which the rye gathered was below the average (in some cases as much as 50 per cent.) were the provinces of Kursk, Orel, Tula, Riazan, Tamboff, Nijni-Novgorod, Samara, Voronej, Saratov, Penza, Astrakan, Bessarabia, the Taurida, the Don Country, Kharkov, Tchernigov, Perm, Moscow, and Grodno. In the remaining portions of the Empire the yield of rye was either an average one or above the average; only in a few districts of the provinces of Yaroslav, Tver, and of some northern provinces was the rye crop good.

Autumn sown wheat also produced either unsatisfactory or bad crops in the provinces in which it is generally cultivated, and it is anticipated that the general harvest will be consi-

derably below the average, as a large portion of the sowings gave such poor prospects of a harvest that they were ultimately re-sown with spring grain.

The oat crop also proved bad in those parts of the country where rye was likewise a comparative failure.

The yield of barley was, as regards general results, satisfactory only in the provinces of Bessarabia, Ekaterinoslav, Livonia, Courland, St. Petersburg, Olonetsk, and in the north; elsewhere the crop was either an unsatisfactory or a bad one, as it suffered from drought in summer and frost in August.

The crops of other spring sown cereals were, as those of oats and barley, partly unsatisfactory and partly bad.

The following are the estimated yields of the various cereals this year in European Russia, exclusive of Poland and the North Caucasus :—

	Cwts.
Rye	273,612,000
Wheat—	
Autumn sown	27,706,000
Spring sown	95,379,000
Oats	147,356,000
Barley	79,279,000
Buckwheat	13,588,000
Millet	22,086 000
Peas	9,809,000
Maize	14,451,000

The principal cereals are thus short of the average in Russia proper by 66,773,000 cwts. in the case of rye, 33,582,000 cwts. in the case of wheat (autumn and spring), 37,454,000 cwts. in the case of oats, and 9,496,000 in the case of barley. Maize alone yielded above the average, 2,275 cwts. The total shortage of all cereals together is estimated at about 130,000,000 cwts.

In the old Polish or Cis-Vistula Provinces autumn and spring sown wheat, oats, millet and peas yielded average crops. The yield of grain there was as follows :—Wheat, autumn sown, 7,621,000, cwts.; spring wheat, 79,000; rye, 24,112,000; oats, 13,402,000; millet, 591,000; and peas, 2,604,000 cwts.

The yield of other cereals was below the average. The shortage, as compared with the average for the five preceding years, is estimated as follows :—Rye, 2,523,000 cwts.; barley, 1,375,000 cwts.; buckwheat, 177,000 cwts.

The whole quantity of cereals yielded in Poland in 1897 was 4,744,000 cwts. under the average for the last five years.

In the Cis-Caucasus, viz., in the Kuban, Tersk, and Stavropol regions, the general result of the yield of the crops was below the average, that of spring-sown grain being in particular unsatisfactory; all the crops, taken together produced 13,690,000 cwts. less than the average yield of the preceding four years.

From the foregoing it appears that the eight principal grain crops of European Russia, inclusive of the Northern Caucasus and the Cis-Vistula provinces, yielded nearly 150,000,000 cwts. below the average. The poor, deficient harvest of grain in 1897 was moreover attended in the black-soil zone by a rather scanty crop of potatoes and roots.

The deficiency of the crops of the present year is reckoned as being somewhat less serious than that of 1891, the famine year, and approaches that of 1880, which was also one of the unsatisfactory harvest years. With the exception of these two years, the deficiency of the harvest of 1897 is the most considerable that has occurred during the last twenty years.

The total estimated yields of rye, wheat, autumn and spring sown, and oats in 1897, in the whole of European Russia, including Poland and the Cis-Caucasus, is given as follows :—

——	Cwts.	Quarters.
Rye - - - - - - - -	299,382,000	69,855,800
Wheat, autumn sown - - - -	49,582,000	11,569,133
Do. spring sown - - - -	101,681,000	23,725,566
Oats - - - - - - - -	163,140,000	58,563,076

CROPS IN AUSTRIA.

The *Wiener Landwirthschaftliche Zeitung* of November 6th, quoting from the official returns, states that the preliminary threshings indicated that the wheat and rye crops were almost everywhere under average; complaints, both as to quality and quantity, being very numerous. Barley had suffered seriously from the weather, and good malting grain was comparatively scarce. In many mountain districts the oats had not ripened, and altogether the outlook for the harvest was not favourable. Potatoes were scarcely up to the average, either in quantity or quality, disease being widely prevalent. Sugar beet was generally reported as an average crop.

Young crops, where sown in the second half of September or early in October, presented a satisfactory appearance; but elsewhere the unfavourable weather which had since prevailed had caused great delay in preparing the land, and in such cases it was expected that the young crops would not come too well through the winter.

CROPS IN ARGENTINA.

According to reports received by *La Agricultura* up to the end of November locusts had made their appearance over a large area of Argentina, but in the principal wheat-growing provinces the crops had, up to that date, escaped serious injury from the ravages of the pest. In Cordoba and Santa Fé the wheat fields were reported to be generally in a satisfactory condition, and equally favourable accounts were forthcoming from Entre Rios and Buenos Ayres. On the other hand, the provinces of San Luis and Mendoza had been visited by immense swarms of locusts, which had done much injury to crops of maize and wheat.

The general tenour of the reports indicated that, in spite of the presence of locusts, there were, in November, prospects of a fair wheat harvest. From observation made in Santa Fé and elsewhere, it appears that the locusts possess less vitality this year than in 1896.

CROPS IN BELGIUM.

The official Report on the Belgian harvest, which has recently been published in the *Moniteur Belge*, states that the crop of 1897 is, in point of quantity, decidedly inferior to that of either of the two preceding years, although the quality of the produce is in general stated to be good. Some extension of the cultivation of oats is reported, and this is the only cereal which shows a higher yield than 1896.

The following table shows the produce per acre of the principal cereals during the last five years :—

Year.	Bushels per Acre.			
	Wheat.	Rye.	Barley.	Oats.
1897	27·0	26·2	35·1	47·3
1896	29·9	30·8	41·9	41·3
1895	28·0	29·1	41·5	47·4
1894	27·5	29·5	39·2	44·7
1893	26·6	27·1	37·0	32·7

On the supposition that the crops of wheat and rye cover about 1,358,000 acres, the produce of the two principal cereals of Belgium would amount to 33,000,000 bushels, or about 8,250,000 bushels less than in the preceding year.

Potatoes gave an average yield of 115 cwts. per acre, or about the same as last year. The quality of the tubers is stated to be good throughout the kingdom. The hay crop was excellent, and a yield of 42 cwts. per acre was obtained.

The yield of sugar beet, which amounted on the average to 213 cwts. per acre, was considerably below the amount obtained from this crop in 1896.

CROPS IN FRANCE.

The official preliminary estimates of the yields of the principal cereals in France in the current year, are shown in the following table, together with the final official figures of the results of the harvest of the preceding year :—

Crops.	1897.	1896.	1897.	1896.
	Acres.	Acres.	Bushels.	Bushels.
Wheat - -	16,165,804	16,969,769	243,531,448	329,291,644
Barley - -	2,183,463	2,109,076	42,741,078	44,663,935
Oats - -	9,986,852	9,673,226	239,296,728	253,009,345
Rye - -	3,562,135	3,705,511	48,301,138	67,278,008

CROPS IN GERMANY.

The preliminary official estimates of the German harvest of 1897, based upon trial threshings throughout the Empire, indicate that the crops have been on the whole about equal to, or a little below, the average. As a result of such threshings, winter wheat is stated to have yielded 25·5 bushels per acre, or exactly the same as the average of such preliminary threshings during the four years 1893-6, as against 26·7 last year. Spring wheat is put at 21·8 bushels per acre, as compared with an average of 21·2. Rye is slightly below the average, that sown in the autumn being estimated at 19·2, and spring rye at 14·7, bushels per acre, as compared with averages of 20·9 and 15·3. The wheat yield appears to have been best in Prussia and Saxony, and generally, in the north and west, the extreme south showing much inferior results; there is less variability in the rye.

The yield of barley is more appreciably below the mean, and is reckoned at 27·8 bushels per acre against an average of 29·4; as with wheat the poorest returns are from the south. Oats are but little below the average of the last four years, being returned at 32·6 bushels per acre ; the average of 1893-6, viz., 33·1, would, however, have heen higher had it not been for a very poor yield in 1893. The potato crop shows considerable fluctuations in different districts; it is on the whole, however,

below the average with 87·5 cwts. this year as against a mean of 94·4 per acre.

Of clover (with lucerne) and meadow hay an exceptionally high yield is recorded, the former being put at 41 and the latter at 34 cwts. per acre, or 32 and 25 per cent. above the average preliminary estimates of 31·1 cwts. and 27·2 cwts. per acre respectively. The southern parts of the Empire have been most favoured in this respect; indeed, meadow-hay in Prussia is a little below the average.

These preliminary estimates of the yield are not to be taken as indicative of the actual amounts harvested per acre, but are useful as enabling an early comparison to be made, by means of similar estimates with the harvests of previous years. The final figures for each year are always much lower than the preliminary estimates, for the reason that these latter represent the results of the first threshings, for which the best samples are usually taken, since they are often required for seed-corn. In the case of cereals, the corrected results are from three to five bushels per acre below those first quoted. The average of the final yields per acre for the four years 1893-6 are given as follows, the figures for the grain crops being in bushels :—

Winter wheat, 22·6; spring wheat, 18·7; winter rye, 17·7; spring rye, 12·5; spring barley, 24·4; oats, 26·9; potatoes, 74 cwts.; clover (with lucerne), 23·7 cwts.; and meadow-hay, 24 cwts.

The newly sown wheat and rye crops are reported to be looking fairly well, although the mark assigned to them is not quite so good as is usually the case at this period of the year. The appearance of clover is rather better than the average.

CROPS IN HUNGARY.

The estimated yield of the chief cereals in Hungary in 1897 was noted in the last number of the Journal. The *Wiener Landwirthschaftliche Zeitung* of the 6th November states that the dry weather in the second half of October enabled cultivation to proceed rapidly, and that autumn work was nearly

completed. The young crops had mostly sprouted well, but in some places had been damaged by mice and insects.

CROPS IN ITALY.

The official preliminary forecast of the yield of wheat in Italy in 1897 has been published in the *Bollettino di Notizie Agrarie*. It is estimated that the crop amounted to 84,232,500 bushels, indicating a reduction of over 40 per cent. when compared with the wheat crop of 1896, which is given as 140,745,000 bushels.

CROPS IN ROUMANIA.

According to reports received through the Foreign Office, the crops in Roumania, which have suffered great damage from rain and floods, are this year very much below the average. The official returns place the wheat yield at but little over half the usual average, viz., only 9·8 bushels per acre, from an area of 3,596,000 acres, as compared with a yield of 18·5 bushels in 1896, and an average during the five years 1892-6 of 16·9 bushels per acre; 544,000 acres of rye are stated to have yielded 12·1 bushels per acre, the mean being 17·3. Barley (1,571,000 acres) yielded 13·1 bushels instead of 17·3, and oats (659,000 acres) 14·4, instead of 18·6 bushels per acre. In addition to the above areas, it is reckoned that 511,000 acres sown with the four chief cereals have been destroyed by inundations, 343,000 of them being under wheat. The colza harvest appears to have been less deficient than the other crops mentioned, although also below the average. It may be noticed that, in spite of the lands flooded, the areas under wheat, rye, barley, and oats are nevertheless considerably above the mean, and barley is above the area cropped last year.

The Roumanian Ministry of Agriculture estimates the losses caused by heavy rains and floods this year at about £1,500,000, without taking into account any diminution in the value of the grain harvested, which is not considered to be of very good quality.

PARLIAMENTARY PUBLICATIONS.

Board of Agriculture.—Annual Report on the Distribution of Grants for Agricultural Education in the Financial Year 1896-7. [*C.*—8690.] *Price* 5½*d.*

The Annual Report dealing with the Administration of the Parliamentary Grant in aid of Agricultural Education shows that out of the funds entrusted to the Board of Agriculture for educational purposes, during the year 1896-7, sums amounting to £6,950 have been distributed in specific grants to 14 separate institutions, and that provision has also been made for the cost of inspecting the work of collegiate bodies and of certain County Councils. The Report, as was the case last year, indicates the advantages gained by a concentration of the larger portion of the educational grants on those centres of agricultural instruction in England and Wales where education of an advanced type can be more easily provided than would be the case in the limited areas of individual County Councils.

The subjects generally taught in these centres of education are then enumerated, and attention is directed to the facilities offered for teaching outside the institution by the lecturers of the College staff in connection with the schemes of particular counties. The number of the general centres of the type referred to remains the same as in the immediately preceding year, but in several directions extensions of their spheres of work have been met by increased assistance from the Board. This is notably the case as regards the Durham College of Science, where an important educational departure has been made by the Northumberland County Council in the acquisition of a farm near Morpeth to be placed at the

disposal of the head of the Agricultural Department at the College for the purposes of feeding experiments and demonstrations of improved processes in the practice of the manuring, tillage, and cropping of land, etc. It is also mentioned that forestry will have its place in the work carried out on the farm, a small nursery for seedlings having been formed and an arboretum projected. To meet the additional expenditure thus entailed the Board have been in a position to make a special grant of £200 besides the £800 voted to the ordinary funds of the College.

Other increases of grants were made in the cases of the University Extension College at Reading, the Nottingham University College, with which the Midland Dairy Institute is associated, and the new South Eastern Agricultural College at Wye, which has been equipped by the counties of Kent and Surrey. Special reference is made to an additional grant of £100 to the University at Cambridge, in order to meet the expenditure entailed by a new course of lectures designed to show the direct application of scientific knowledge to the practice of Agriculture. A hope is expressed that the success of this experiment may perhaps ultimately lead to the establishment of a Chair of Agriculture and Forestry, a step which might prove of great advantage to a large class of students.

Grants have been continued for another year to two special Institutes devoted solely to dairy education, viz.: the British Dairy Institute and the Eastern Counties Dairy Institute; while special grants have been made to the Bath and West of England Society for their research work into the conditions affecting the manufacture of Cheddar cheese and cider.

Although grants for agricultural education in Scotland are now dealt with by the Scottish Office, and the educational grants of the Board of Agriculture are therefore practically restricted to institutions in England and Wales, it has been found convenient to continue for the present certain specific grants of an exceptional character to the Royal Botanic Garden at Edinburgh, the Highland and Agricultural

Society, and the Agricultural Research Association of Aberdeen.

Beyond the distribution of grants, the services of the Board have been in demand in the year under review in according advice and assistance to various Local Authorities, while formal inspections have, in accordance with the request of the County Councils, been made of the agricultural educational work undertaken in Northumberland, Cumberland, Derby, Essex, Berkshire, Hampshire, and Dorset.

Three appendices are attached to the main report:—

The first of these gives an Epitome of Reports from Institutions receiving grants, showing the work done, number of pupils, attendance, and cost.

The second takes the form of a series of notes upon certain typical experiments conducted by institutions which have been aided by the Board of Agriculture, and embodies some valuable additions to the records of agricultural science.

The last appendix deals with the attempt made by the Board to obtain and exhibit in a series of comparative statements, the chief features of the agricultural instruction provided out of the funds available under the Customs and Excise (Local Taxation) Act, 1890, by each County Council in England and Wales. With this object a circular was issued to various County Councils requesting replies to a series of questions.

The information thus obtained is embodied in four following statements:—

Statement No. 1 presents for each county a brief summary of the general scope and character of the facilities provided for agricultural instruction, and of the organisation and machinery through which the work is done.

Statement No. 2 shows the different forms of agricultural instruction provided locally, distinguishing the principal subjects taught, the length of the courses, and the number of individuals coming under instruction.

Statement No. 3 indicates in a succinct form the nature and object of the experimental work undertaken in certain

counties, specifying the cases where such experiments were carried out under the supervision of educational institutions within or without the county.

Statement No. 4 shows the expenditure estimated to have been incurred in each county in the year 1896-97 in providing the instruction and experiments referred to above.

Although in view of the widely different character of the machinery employed, and the varying system of recording the results, it is only possible to form a very rough estimate of the educational work carried on throughout the country, nevertheless numerous features of interest are disclosed.

All who are interested in the important subject of the organisation of technical instruction may with advantage have recourse to this Appendix, which will afford many important details of the local work of agricultural instruction. The following list of grants is extracted from the Report:—

LISTS OF GRANTS AWARDED.—1896-97.

Institutions Aided.	Work.	Grant.
		£
University College of North Wales, Bangor	Collegiate Centre - -	800
Yorkshire College, Leeds - - -	Ditto - -	800
Durham College of Science, Newcastle-on-Tyne	Ditto - -	800
Ditto ditto ditto	Experimental Farm - -	200
University College of Wales, Aberystwith	Collegiate Centre - -	800
University Extension College, Reading	Ditto - -	800
University College, Nottingham - -	Ditto - -	600
Cambridge and Counties Agricultural Education Committee	Ditto - -	500
South-Eastern Agricultural College, Wye	Ditto - -	400
Eastern Counties Dairy Institute, Ipswich	Dairy Instruction - -	300
British Dairy Institute, Reading - -	Ditto - -	300
Bath and West and Southern Counties -	Special Cheese and Cider Research and Agricultural Experiments	300
Highland and Agricultural Society -	Agricultural Experiments -	100
Agricultural Research Association, Aberdeen	Ditto - -	100
Royal Botanic Garden, Edinburgh -	Class for Working Foresters and Gardeners	150

Board of Trade.—Fourth Annual Report on Changes in Wages and Hours of Labour in the United Kingdom, 1896. [C.—8444.] *Price* 1*s.* 6*d.*

Particulars of changes in the wages of agricultural labourers have again been collected in the same manner as hitherto, *i.e.*, by applying to the Chairmen of Rural District Councils in England and Wales for the current rates of the weekly cash wages in June and December. The information again applies only to ordinary agricultural labourers, and men engaged exclusively about animals are not included.

The particulars of increase and decrease in wages in England and Wales in the years 1896 and 1895 are summarised in the following table :—

—	Changes in 1896 as compared with 1895.		Changes in 1895 as compared with 1894.	
	Number of labourers affected.	Change per week per head.	Number of labourers affected.	Change per week per head.
		s. d.		s. d.
Increases - - -	58,578	+ 0 $8\frac{1}{2}$	27,556	+ 0 $6\frac{1}{4}$
Decreases - - -	40,751	− 0 10	92,334	− 0 $8\frac{3}{4}$
Total labourers affected and average net change -	99,329	+ 0 1	119,890	− 0 $5\frac{1}{4}$

It thus appears that there was on the whole a tendency towards an increase in the wages of labourers, whereas in 1895 there was a decrease. On the whole number of agricultural labours in England and Wales, the rise per head in 1896 amounts to about $\frac{1}{8}$d. per week as compared with a fall of $\frac{3}{4}$d. in 1895. It should be noted, however, that in addition to the definite changes in wages recorded here, there were 50,738 men in receipt of a certain range of wages whose pay (by a change in the maximum or minimum rate) showed a tendency to increase, and 31,406 whose wages similarly showed a tendency to decrease.

As regards the districts where the recorded changes occurred, it appears from the following table that the most numerous alterations took place in the principal corn-

growing districts, namely, the midland and eastern counties :—

Districts.	Changes in 1896 as compared with 1895.		Changes in 1895 as compared with 1894.	
	Total Number affected.	Net change per head per week.	Total number affected.	Net change per head per week.
		s. d.		s. d.
Northern Counties - -	5,662	− 0 $1\frac{3}{4}$	3,766	+ 0 $2\frac{3}{4}$
Yorks, Lancashire, and Cheshire - - -	2,897	+ 0 $8\frac{1}{4}$	3,942	− 0 $7\frac{3}{4}$
Eastern and Midland Counties - - -	63,869	+ 0 $2\frac{1}{4}$	89,576	− 0 $5\frac{1}{2}$
Southern and Western Counties - - -	20,901	− 0 4	20,441	− 0 $6\frac{3}{4}$
Wales- - - - -	—	—	2,165	+ 0 $8\frac{1}{4}$
Total numbers and net change of wages - -	99,329	+ 0 1	119,890	− 0 $5\frac{1}{4}$

In Scotland information has been obtained from a number of employers of agricultural labour in each county, and also as to the rates of wages obtained at a number of hiring markets. The farm servants are all hired yearly or half-yearly, and very few changes have taken place; where changes have been made they have not been of sufficient importance to affect the wages of any particular class.

In Ireland information has been received with regard to the wages of agricultural labourers in each county, and no material changes are reported to have taken place.

Money Lending.—Report from the Select Committee on Money Lending, together with the proceedings of the Committee, minutes of Evidence, Appendix, and Index. [H.C.—364.] *Price 2s. 9d.*

This publication contains the evidence already taken before the Select Committee appointed to inquiry into the alleged evils attending money-lending transactions at high rates of interest, or under oppressive conditions as to repay-

ment, between the poorer classes and professional money-lenders.

The committee having been unable to conclude their enquiry, recommend that a committee on the same subject be appointed in the next Session of Parliament.

The Annual Local Taxation Returns [England] for the year year 1894-95. *Part vii.* [H.C.—318.] *Price* 1*s.* 1½*d.*

This volume contains a summary of the returns, already published in six parts, and give abstracts of the receipts, expenditure and loan transactions of no less than 34,324 local authorities, which include the overseers of the poor in 15,154 parishes, 62 county councils, 1,200 burial boards, &c., 6,473 surveyors of separate highway parishes and 2,400 school boards.

Horse-breeding. Sixth Report of the Royal Commission on Horse Breeding. [C.—8593.] *Price* 2*d.*

This report relates to the period intervening between the 3rd July, 1895, and the 26th July, 1897. During this interval two shows were held in London at which the Queen's premiums were awarded.

The number of stallions entered in the district classes continues satisfactory, and suitable horses were selected out of those exhibited to locate in the various districts in England, Wales, and Scotland.

An appended schedule indicates that owners of mares continue to show their appreciation of the opportunity to have them served by stallions of approved soundness. In one or two instances, however, premium stallions did not cover the prescribed number of mares during the season of service, and the Commissioners have therefore deemed it desirable to formulate a new regulation which will enable them, in view of such cases, to reduce the amount of the premium.

The desirability of limiting the age of stallions, and excluding those which are unfruitful, in the competitions for Queen's premiums, has been the subject of careful considera-

tion, and the Commissioners are of opinion that the time has arrived when some alteration of the rules is required, and they therefore propose to introduce fresh regulations in the next premium list.

Agricultural Produce (Marks) Bill. Report and Special Report from the Select Committee on the Agricultural Produce (Marks) Bill; with the Proceedings of the Committee, Minutes of Evidence, Appendix and Index. [H.C.—365.] *Price 2s.*

A notice of this Report of the Committee has already appeared in this Journal (Vol. iv., p. 262). The present publication contains the evidence given by the 22 witnesses examined, several appendices with statistical information relating to the meat supply, and a detailed index to the volume.

Lights upon Vehicles—Return showing the Bye-laws made by the Councils of Counties and Boroughs as to Lights upon Vehicles, giving particulars, as far as possible, of the points of difference therein. [*C.*—8687.] *Price* 2½*d.*

This publication contains a list of places for which bye-laws have been made under the power conferred by Section 23 of the Municipal Corporations Act, 1882, upon the councils of municipal boroughs, and by that enactment and Section 16 of the Local Government Act, 1888, upon county councils.

Speaking generally, the bye-laws impose upon vehicles in streets, highways, and other public places an obligation to carry lights at night similar to that laid upon cyclists by Section 85 of the Local Government Act, 1888, with, in some cases, the additional requirement that vehicles carrying loads which project towards the rear should carry a rear light.

The proposed bye-laws which have been submitted to the Secretary of State by borough and county councils have shown considerable variety of views as to the extent and nature of the regulations required in the interest of public

safety and convenience within their respective districts. In dealing with these proposals, as it is obviously undesirable that persons passing from one county or borough to another should have to comply with different and sometimes inconsistent requirements, the Secretary of State has aimed at securing, as far as possible, uniformity in the regulations.

Reasons are given why it has been impossible always to insist on complete uniformity; and the main points of difference between the various bye-laws are also stated.

Woods and Forests. The Seventy-fifth Report of the Commissioners of Her Majesty's Woods, Forests, and Land Revenues, in obedience to the Acts of 10 *Geo. IV.* (*Cap.* 50), *and* 2. *Will. IV.* (*Cap.* 1); *being the Forty-sixth Report under the Act of the* 14 *&* 15 *Vict.* (*Cap.* 42). [*H.C.* 267.] *Price* 1*s.* 7*d.*

This volume contains the Report for the year ended 31st March, 1897, of the Commissioner in charge of the woods, royal forests, crown and certain other allotments in in England; of the land revenue of the crown in Scotland, Ireland, Wales, and in the Isles of Man and Alderney; and of the fee farm and other unimprovable rents of the crown in Wales.

The property in question is as follows:—

1. The New Forest, including Bere, Parkhurst, Woolmer, and Alice Holt Woods, and the Manor of Lyndhurst.

2. Dean Forest, including Highmeadow and Great Doward Woods, and the Manors of St. Briavels, Staunton, and English Bicknor.

3. The whole Crown property in Wales, County Monmouth, in Scotland, in Ireland, and in the Isles of Man and Alderney.

The income derived from the New Forest consists of receipts from sales of forest produce, amounting in the year 1896-97 to £7,355 4s. 11d., and certain surface rents, amounting in the same year to £3,099 11s. 8d.

The income derived from the Forest of Dean from the

sources above mentioned amounted to £5,305 17s. 7d. and £1,856 12s. 11d. respectively. The mining royalties received amounted to £13,906 19s. 7d. During the year there were about 660 acres added to the area inclosed for planting purposes under the powers contained in the Acts 20, Car. 2, c. 3, and 49 Geo. 3, c. 72.

With a view to introduce in the Forest of Dean and the Highmeadow Woods a more scientific and systematic system of forest cultivation than has hitherto been adopted, the Commission has arranged with an experienced Conservator of Forests in the Indian Forest Service to make a detailed examination of the woods, etc., and furnish a report on them. It is desired not only to improve the prospective yield of the Forest, but also to establish such a system of management as may serve those who desire to study forestry in this country with a good practical object lesson, such as at the present time they have to go to France or Germany to find.

The Crown property in Scotland produced an income of £24,737 16s. 1d. during the year. The Crown rents and duties amounted to £37,954 8s. 4d. in Ireland, and to £15,107 12s. 7d. in Wales.

The volume contains appendices, giving detailed account of the monies derived from the hereditary possessions of the Crown.

Statistical Abstract relating to British India from 1886 *to* 1895-96. *Thirty-first number.* [C.—8659.] *Price* 1*s.* 3*d.*

This publication contains, among other Indian statistical information, details relating to the population engaged in agriculture, the land revenue, the area cultivated, irrigated, and surveyed, the varieties of tenure, the number of stock, and the annual average prices of food grains in India during the period 1871 to 1895.

Agricultural Rates Act, 1896 (*Grants to Spending Authorities*) [H.C.—369.] *Price* 3*d.*

This return shows, as regards each of the spending authorities under the Agricultural Rates Act, 1896, the

amount certified by the Local Government Board as the share of the annual grant under that Act payable to such authority.

The amounts certified as payable to various bodies are summarised as follows:—County Councils, £329,199 1s. 8d.; Councils of Boroughs, £18,121 3s. 4d.; Councils of Urban Districts other than Boroughs, £5,366 5s. 8d.; Councils of Rural Districts, £327,091 3s. 10d.; Boards of Guardians, £506,059 7s.; receiver for the Metropolitan Police District, £4,389 14s. 8d.; School Boards, £107,347 3s. 8d; Highway Boards, £16,368 7s.; Surveyors of Highways, £18,570 5s.; total for England and Wales, £1,332,512 11s. 10d.

Local Taxation Returns (Scotland). The Annual Local Taxation Returns for the Year 1894-5. [H.C.—343.] *Price 2s. 5d.*

This volume is the fifteenth annual return under the Local Taxation Returns (Scotland) Act, 1881, and contains abstracts of the receipts and expenditure of the various local authorities of Scotland for the year 1894-5.

In a memorandum and summary of the returns it is stated that the revenue, excluding loans, of the various local authorities amounted to £8,952,071 in 1894-95, duplicate entries in transactions between local bodies being deducted. Of this sum £3,758,480 was derived from assessment, £961,976 from tolls, dues, fees, and fines, £1,551,421 from Imperial subventions and payments, and £2,680,194 from miscellaneous sources. The total expenditure of the various local authorities not defrayed out of loans in 1894-95 was £9,174,843; and the expenditure met out of borrowed money amounted to £2,317,627.

The amount of debt of local authorities in Scotland outstanding at the close of the financial year 1894-95 was £32,746,589, and the amount for 1893-94, taken from the returns for that year, with certain adjustments based upon more recent information, was £31,810,094.

In 1893-94 the total loans of local authorities amounted to £7 14s. 8d. per head of the estimated population of Scotland; in 1894-95 they rose to £7 18s. 2d. per head.

Local Taxation Returns (England). The Annual Local Taxation Returns. Part III. 1894-95. [H.C.—367-1.] *Price* 4*s.* 9½*d.*

This volume of the local taxation returns for the financial year 1894-95 contains abstracts of the returns made by town councils acting as municipal and urban sanitary authorities, and as urban district councils, by local boards and improvement commissioners (now urban district councils), joint boards, rural sanitary authorities and rural district councils, parish councils and parish meetings, port sanitary authorities, burial boards, commissioners of baths and washhouses, conservators of commons and trustees of certain open spaces, commissioners of free public libraries, lighting and watching inspectors, commissioners of markets and fairs, and bridge and ferry trustees.

The Twenty-sixth Annual Report of the Local Government Board, 1896-97. [C.—8583.] *Price* 4*s.* 11*d.*

This publication contains, among much other information, details of the result of analyses made during the year under the provisions of the Sale of Food and Drugs Act, 1875.

As regards dairy products, it is shown that out of 45,555 samples analysed in 1896, as many as 18,795 were of milk, and that of this number 2,091, or 11·1 per cent., were reported to be adulterated. This proportion is the same as that for the previous year, but is only a little more than half the proportion shown in the returns for the five years 1877-81. It is held to be more than probable that this does not represent the full extent of milk adulteration in England, inasmuch as public analysts adopt a very low standard so that injustice may not be inflicted upon vendors of poor but genuine, milk.

In London the high rate of 17·7 per cent. of adulteration obtained in 1896-7, as against 9·1 per cent. for the rest of the country. Among the 32 great towns included in the Registrar-General's Weekly Returns, only seven, namely, Birmingham, Nottingham, Portsmouth, Sunderland, Norwich, Swansea, and Wolverhampton had a percentage of milk

adulteration as unsatisfactory as that of London. In Manchester, Salford, Leicester, Cardiff, Huddersfield, and Halifax, the proportion of samples of milk condemned was under 3 per cent.

The necessity of a supervision of the milk supply on Sundays is illustrated by the case of Clerkenwell, where, during the months of May, June, and July, 42 samples of milk were taken on Sunday mornings, and as many as 20 of them, or $47\frac{1}{2}$ per cent., were found to be adulterated, one sample being certified as skimmed to the extent of 90 per cent., and also to have had 23 per cent. of water added. It is pointed out that whenever the local authorities seriously take the matter in hand the Sunday rate of milk adulteration is reduced.

Legal proceedings were taken against the vendors of 1,336 out of 2,091 samples of milk reported against, and in 1,101 cases penalties were imposed amounting to £1,746 16*s.* 8*d.* There were 73 fines of £5 each, two between £5 and £10, fifteen of £10 each, two between £10 and £20, and two of £20. The remaining 1,007 fines included 138 of 5*s.* or less, 29 of them being of 1*s.* and under.

Butter, or what was sold as butter, was the subject of analysis in 8,256 cases, 725, or 8·8 per cent., being reported as adulterated. This percentage is less than half of that shown in the returns for the five years preceding the passing of the Margarine Act, 1887. On the other hand, of 345 samples taken during 1896 on behalf of the Royal Lancashire Agricultural Society, under an arrangement by which samples are analysed by the county analyst free of charge to the society, as many as 125, or 36·2 per cent., were condemned. The county analyst accounts for this extraordinarily high rate of butter adulteration by stating that the inspector of the society "by devoting himself entirely to butter has become, to a certain extent, an expert in that one article, and is able very frequently to distinguish impure or doubtful from genuine butter by simple inspection, and only samples which he thinks suspicious are purchased by him." It is not surprising that samples procured under these circumstances should be condemned in a far greater pro-

portion of cases than those taken by inspectors under the Act. Deducting these 345 samples and also the few submitted for analysis by private purchasers throughout the country, the rate of butter adulteration is reduced to $7\frac{1}{2}$ per cent. In London the rate was 11·5 per cent.; in the 32 "great towns" it was 12·0 per cent., while in th smaller towns and the districts within the jurisdiction of the county councils (excluding the 345 samples before referred to) the percentage was as low as 4·6.

Legal proceedings were taken in respect of 654 samples, and 577 fines were inflicted, amounting in the aggregate to £1,075 17s. 5d. There was one fine of £40 and one of £21 10s., these being for infringements of the Margarine Act; two were of £15, 18 of £10, three between £5 and £10, and 40 of £5 each. The remaining 512 fines averaged £1 2s. 10d., but a large number of them were of trivial amount, ranging from 6d. upwards. Under the Margarine Act the maximum fine for the third and any subsequent offence is £100, but this penalty does not appear to have ever been inflicted. There have been only five fines above £20, and these ranged between £25 and £55, the latter being for offences in respect of several samples.

PRICES OF LIVE STOCK.

Returned under the Weighing of Cattle Act.

The returns of prices received by the Board of Agriculture under the Markets and Fairs (Weighing of Cattle) Act, 1891, from 19 scheduled places in Great Britain are now available for the third quarter of 1897. These returns show the number of animals entering the public markets or auction marts, the number of those whereof the live-weights were ascertained on the weighbridges, and they purport to give, so far as can be ascertained by the market authorities and auctioneers respectively, the current prices per live stone or live cwt. The total number of cattle, sheep, and swine reported to the Board as entering, weighed, and priced within the 19 scheduled places, in the three months ending 30th September, 1897, compare as under with the statistics for the same quarter of the two previous years :—

Animals.	3rd Quarter, 1897.	3rd Quarter, 1896.	3r Quarter, 1895.
CATTLE :	No.	No.	No.
Entering markets - - -	223,323	227,346	270,831
Weighed - - - - -	26,024	24,471	22,320
Prices returned - - - -	23,037	22,481	19,345
Prices returned with quality distinguished.	18,172	16,857	13,815
SHEEP :			
Entering markets - - -	1,380,624	1,424,166	1,444,156
Weighed - - - - -	12,290	11,028	9,727
Prices returned with quality distinguished.	10,485	8,476	7,348
SWINE :			
Entering markets - - -	44,428	46,431	48,127
Weighed - - - - -	696	1,346	1,014
Prices returned - - - -	474	503	453
Prices returned with quality distinguished.	474	503	2

Rather fewer cattle, sheep, and swine were, it appears shown in the markets in the three months in question, but the diminution is not great compared with the like months of 1896, nevertheless the numbers of cattle and sheep which were weighed, and of which the prices were recorded in the manner required by the statute, exhibit again an increase. Of cattle the number whereof weights are reported is now more than 11½ per cent. of the total shown, and the prices of about 8 per cent., for which complete information was given, are recorded in these returns. In sheep, the numbers weighed and priced are still relatively small, and in the case of pigs the statistics are even more defective than last year.

Weighing, as the detailed table on page 414 shows, still continues to be much more resorted to in Scotland than in England. Out of 167,786 cattle shown in 14 English markets, the number returned as weighed is under 8,000 in the three months, prices being given with quality distinguished in 5,484 cases, whereas out of the 55,537 head shown in markets and marts of Scotland, nearly a third, or 18,000 head, were weighed, and full price particulars were supplied in 12,688 instances.

A comparison of the returns for the first nine months of the present year with those for the corresponding period of 1896 shows only a slight improvement in the proportion of cattle weighed. In England, out of a total of 571,952 beasts shown in the markets this year, only 21,325 (or 3·7 per cent.) were passed over the weighbridge, while in the first three quarters of last year, out of 566,302 cattle marketed, 20,248 (or 3·6 per cent.) were weighed. For Scotland, the returns for the same intervals show that in the current year 61,056 beasts out of 192,424 (or 31·7 per cent.) were weighed; the percentage last year being 31·1.

Attention may be drawn to the number weighed at individual places, as shown in the general table, wherein it appears that no instance of the use of the weighbridge for any description of animal, in the past quarter, was reported from either Birmingham or Norwich, while the numbers returned from Ashford, Bristol, Lincoln, and York were

infinitesimal. In London and in Shrewsbury, on the other hand, one in every five of the cattle shown was weighed. Prices were ascertained in nearly every instance at Shrewsbury, but in less than half the cases reported from London. The transactions reported from Shrewsbury are also remarkable in consisting mainly of store cattle. As regards sheep, only two English markets, Leicester and Leeds, furnish prices of weighed animals, and the Metropolitan Market Authority, although reporting the weighing of 1,542 sheep, have failed to discover the price in any single instance. Of the 12,290 sheep weighed in Great Britain, 7,239 were returned from the auctions of Aberdeen alone. In swine, no instance of weighing is reported from any place in Scotland, except Perth, and there only 91 are recorded, and although weighings of swine are returned from Newcastle, Leeds, Leicester, and London, prices are quoted only in Newcastle in 375 instances, and in Leicester in 8.

The following table shows the average of the prices of fat cattle, according to quality, in the undernoted ten places, which have been compared on former occasions :—

Places.	Inferior. (3rd Quality.)			Good. (2nd Quality.)			Prime. (1st Quality.)		
	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.
		s. d.	s. d.		s. d.	s. d.		s. d.	s. d.
Leeds	4	3 6	28 0	96	3 9	30 0	132	4 0½	32 4
Liverpool	—	—	—	443	3 9½	30 2	1 194	4 1¼	32 10
London	14	3 7	28 8	608	4 2¼	33 6	857	4 9	38 0
Newcastle	1	3 5¾	27 10	8	3 9	30 0	361	4 8¼	37 6
Shrewsbury	8	3 2¾	25 10	15	3 11½	31 8	17	4 3½	34 4
Aberdeen	848	3 1¾	25 2	2,207	4 3	34 0	1,739	4 7¼	36 10
Dundee	90	3 4½	27 0	1,339	4 0¾	32 6	1,093	4 5½	35 8
Edinburgh	—	—	—	2,188	4 3	34 0	403	4 5¾	35 10
Glasgow	336	3 10	30 8	605	4 1½	33 0	789	4 6¼	36 2
Perth	157	3 11¼	31 6	355	4 3½	34 2	281	4 6¾	36 6

The values per live cwt. thus calculated range from a minimum average of 25s. 2d. for animals of the inferior class at Aberdeen to 31s. 6d. at Perth. In the second or medium grade, the range is less—from 30s. per cwt. at Leeds and Newcastle to 34s. 2d. at Perth. In prime cattle, the Shrewsbury returns of fat stock show 34s. 4d. per cwt., but this average is deduced from the sale of 17 animals only, whereas the

maximum local average is that reached in London, where the figure, calculated on 857 transactions, reaches 38s. per cwt., Newcastle came next with 37s. 6d., and Aberdeen with 36s. 10d.

Compared with the prices of the third quarter of 1896 the quotations stand as under :—

PLACES.	INFERIOR or Third Quality.		GOOD or Second Quality.		PRIME or First Quality.	
	1897.	1896.	1897.	1896.	1897.	1896.
	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.
Leeds	28 0	28 0	30 0	30 0	32 4	32 0
Liverpool	—	—	30 2	29 4	32 10	32 0
London	28 8	27 0	33 6	32 2	38 0	36 0
Newcastle	27 10	26 4	30 0	31 2	37 6	34 2
Shrewsbury	25 10	24 10	31 8	30 4	34 4	33 6
Aberdeen	25 2	24 0	34 0	31 8	36 10	34 10
Dundee	27 0	26 4	32 6	31 10	35 8	34 0
Edinburgh	—	—	34 0	33 2	35 10	34 6
Glasgow	30 8	31 8	33 0	32 4	36 2	35 2
Perth	31 6	30 0	34 2	32 2	36 6	34 6

Glasgow alone quotes any reduction in the group of inferior cattle, increases up to 1s. 8d. and 1s. 6d. per cwt. occurring in several instances. Except for a lower Newcastle quotation and a stationary one at Leeds, the second quality animals seem to have sold for more money, while as regards prime cattle, there is no exception to the rise of price recorded in these ten towns, the quotation standing 2s. per cwt. above that of 1896 at London, Aberdeen, and Perth, and being apparently 3s. 4d. up in the case of Newcastle.

Transactions by actual live weight are reported from seven places at rates varying from 22s. 8d. per cwt., in one instance, to 37s. 4d. per cwt. on the mean of 105 animals, according to quality. Both of these extremes occurred in London, the total number of cattle thus sold reaching 1,585.

The prices of store stock, of which almost exactly the same number, 1,583, were weighed, ranged from 21s. to 34s. 6d. A total of 225 store cattle were sold by actual live weight at Edinburgh at 29s. 6d. per cwt.

The total number of cattle, sheep, and swine entering the markets and marts of the under-mentioned places in England

and Scotland with the number weighed, as received from the market authorities in the third quarter, 1897, under the Markets and Fairs (Weighing of Cattle) Act, 1891 (54 & 55 Vict. c. 70), was as follows:—

Places.	Cattle.			Sheep.			Swine.		
	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.
England.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
Ashford	3,342	14	—	36,997	10	—	2,522	—	—
Birmingham	4,351	—	—	36,141	—	—	16,617	—	—
Bristol	11,471	11	11	43,629	—	—	—	—	—
Leicester	11,086	289	231	30,586	20	13	824	12	8
Leeds	6,190	232	232	32,680	—	—	748	209	—
Lincoln	1,289	12	8	18,985	—	—	1,350	—	—
Liverpool	13,591	1,637	1,637	144,468	815	815	—	—	—
London	17,595	3,642	1,479	162,590	1,542	—	770	9	—
Newcastle-upon-Tyne	22,617	370	370	111,789	—	—	4,593	375	375
Norwich	13,473	—	—	68,821	—	—	6,118	—	—
Salford	25,331	214	149	213,384	—	—	217	—	—
Shrewsbury	7,141	1,408	1,365	33,118	100	—	790	—	—
Wakefield	18,364	84	—	46,927	40	—	—	—	—
York	11,945	2	2	45,109	—	—	—	—	—
Scotland.									
Aberdeen	12,310	4,794	4,794	86,627	7,239	7,239	4,819	—	—
Dundee	3,370	2,704	2,526	6,275	617	617	284	—	—
Edinburgh	14,724	6,248	*2,845	54,153	—	—	1,158	—	—
Glasgow	10,458	1,929	1,730	136,896	238	132	1,364	—	—
Perth	14,675	2,434	*793	71,449	1,669	1,669	2,254	91	91
Total for England	167,786	7,915	5,484	1,025,224	2,527	828	34,549	605	383
Total for Scotland	55,537	18,109	*12,688	355,400	9,763	9,657	9,879	91	91
Total	223,323	26,024	*18,172	1,380,624	12,290	10,485	44,428	696	474

* Prices for 3,224 cattle in addition to the above were quoted from Edinburgh, and for 1,641 cattle from Perth, but without distinguishing the quality.

PRICES OF MEAT, CORN, AND DAIRY PRODUCE.

AVERAGE PRICES of DEAD MEAT, per Stone of 8 lbs., at the LONDON CENTRAL MEAT MARKET, during the third Quarter and during the Months of August, September, and October, 1897.

(Compiled from the prices quoted weekly in the "Meat Trades Journal.")

DESCRIPTION.	3RD QUARTER 1897.	AUGUST, 1897.	SEPTEMBER, 1897.	OCTOBER, 1897.
BEEF :—	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*
Scotch, short sides	4 3 to 4 7	4 2 to 4 6	4 2 to 4 6	4 2 to 4 5
,, long sides	3 11 ,, 4 2	3 11 ,, 4 1	3 9 ,, 4 1	3 9 ,, 4 0
English	3 8 ,, 3 10	3 7 ,, 3 10	3 7 ,, 3 10	3 6 ,, 3 8
Cows and Bulls	2 2 ,, 2 10	2 3 ,, 2 10	2 4 ,, 2 11	2 2 ,, 2 10
American, Birkenhead killed	3 2 ,, 3 5	3 1 ,, 3 5	3 4 ,, 3 7	3 0 ,, 3 4
,, Deptford killed	3 2 ,, 3 5	3 2 ,, 3 6	3 3 ,, 3 6	3 0 ,, 3 5
Argentine ,, ,,	2 5 ,, 2 11	2 7 ,, 2 11	2 10 ,, 3 2	2 6 ,, 2 10
American Refrig. hind-quarters	3 6 ,, 3 9	3 7 ,, 3 10	3 7 ,, 3 10	3 3 ,, 3 6
,, ,, fore-quarters	2 1 ,, 2 4	2 2 ,, 2 4	2 3 ,, 2 5	1 10 ,, 2 2
Australian, Frozen hind-quarters	2 0 ,, 2 2	1 11 ,, 2 1	1 8 ,, 1 10	1 5 ,, 1 8
,, ,, fore-quarters	1 4 ,, 1 6	1 4 ,, 1 6	1 6 ,, 1 7	1 3 ,, 1 5
MUTTON :—				
Scotch, Prime	4 6 ,, 4 11	4 6 ,, 4 11	4 4 ,, 4 9	4 3 ,, 4 8
English, Prime	4 3 ,, 4 9	4 3 ,, 4 9	4 2 ,, 4 6	4 0 ,, 4 5
Ewes	3 0 ,, 3 5	3 0 ,, 3 6	2 11 ,, 3 4	2 9 ,, 3 2
Continental	3 8 ,, 4 2	3 9 ,, 4 3	3 5 ,, 3 11	3 2 ,, 3 9
River Plate, Town killed	3 0 ,, 3 3	3 3 ,, 3 6	3 0 ,, 3 3	2 11 ,, 3 2
New Zealand, Frozen	2 0 ,, 2 5	2 0 ,, 2 5	2 0 ,, 2 4	2 0 ,, 2 4
Australian, Frozen	1 7 ,, 1 9	1 6 ,, 1 8	1 8 ,, 1 10	1 8 ,, 1 9
River Plate, Frozen	1 7 ,, 1 9	1 6 ,, 1 8	1 8 ,, 1 10	1 8 ,, 1 9
LAMB :—				
English	4 7 ,, 5 3	4 9 ,, 5 4	4 3 ,, 4 10	— —
New Zealand, Frozen	2 2 ,, 2 6	2 1 ,, 2 5	2 0 ,, 2 2	2 0 ,, 2 4
VEAL :—				
English	3 9 ,, 4 4	3 8 ,, 4 4	3 11 ,, 4 4	4 0 ,, 4 6
Foreign	3 1 ,, 3 7	2 11 ,, 3 7	3 1 ,, 3 8	3 5 ,, 3 11
PORK :—				
English, best	3 9 ,, 4 1	3 8 ,, 4 0	4 2 ,, 4 6	4 2 ,, 4 7
,, secondary / Foreign	3 1 ,, 3 6	3 0 ,, 3 5	3 5 ,, 3 11	3 7 ,, 3 11

AVERAGE WHOLESALE PRICES of CATTLE and SHEEP, per Stone of 8 lbs., sinking the offal, at the METROPOLITAN CATTLE MARKET, during the undermentioned Quarters of 1896 and 1897 :—

PERIOD.	CATTLE.			SHEEP.		
	Inferior.	Second.	First.	Inferior.	Second.	First.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
3rd Quarter, 1896	2 4	3 9	4 4	3 2	4 8	5 4
4th Quarter ,,	2 4	3 9	4 6	3 2	4 10	5 5
1st Quarter, 1897	2 5	3 11	4 6	3 9	5 1	5 9
2nd Quarter ,,	2 5	4 0	4 7	3 10	4 11	5 8
3rd Quarter ,,	2 4	4 0	4 7	3 7	5 0	5 8

AVERAGE WHOLESALE PRICES OF BEEF and MUTTON, per Stone of 8 lbs., by the Carcase, at LIVERPOOL and GLASGOW, during the undermentioned Quarters of 1896 and 1897 :—

PERIOD.	LIVERPOOL.*		GLASGOW.†	
	BEEF.	MUTTON.	BEEF.	MUTTON.
	s. d. s. d.	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*
3rd Quarter, 1896	2 6 ,, 3 4	3 4 ,, 4 10	2 4 ,, 3 8	3 4 ,, 4 6
4th Quarter ,,	2 2 ,, 3 6	2 8 ,, 4 6	2 0 ,, 3 8	3 0 ,, 4 4
1st Quarter, 1897	2 8 ,, 3 6	3 4 ,, 5 2	2 8 ,, 4 0	4 0 ,, 5 0
2nd Quarter ,,	2 8 ,, 3 6	2 8 ,, 5 4	2 8 ,, 4 0	3 4 ,, 4 10
3rd Quarter ,,	2 8 to 3 8	3 4 to 4 8	2 4 to 3 8	3 4 to 4 4

* Compiled from information furnished by the Medical Officer of Health, Liverpool. The prices quoted are for Carcases of Animals *slaughtered at the Liverpool Abattoir*, and do not apply to Imported Meat.

† Compiled from information furnished by the Principal of the Veterinary College, Glasgow.

BERLIN MARKET.

AVERAGE PRICES of CATTLE and SHEEP (First Quality Dead Weight) in the BERLIN CATTLE MARKET in the undermentioned Months of 1897.

MONTHS.	CATTLE. Per Cwt.	SHEEP. Per Cwt.
1897.	*s. d.*	*s. d.*
September - - -	64 5 to 70 9	59 7 to 64 5
October - - - -	62 11 ,, 68 8	57 5 ,, 61 8
November - - -	61 7 ,, 66 2	55 6 ,, 59 4

NOTE.—The above prices have been compiled from the weekly returns published in the *Deutsche Landwirthschaftliche Presse.*

PARIS MARKET.

AVERAGE PRICES of CATTLE, SHEEP, and SWINE (Medium Quality) in the PARIS CATTLE MARKET in the undermentioned Months of 1897.

MONTHS.	OXEN. Per Cwt.	CALVES. Per Cwt.	SHEEP. Per Cwt.	PIGS. Per Cwt.
LIVE WEIGHT.				
1897.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
September - -	30 11	34 8	39 1	37 4
October - -	30 5	34 0	38 2	34 0
November - -	29 8	36 8	38 2	30 10
DEAD WEIGHT.				
1897.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
September - -	56 8	64 7	68 11	52 11
October - - -	52 11	68 3	67 5	55 5
November - -	52 11	67 7	66 5	44 7

NOTE.—The above prices have been compiled from the weekly returns published in the *Journal d'Agriculture Pratique.*

CHICAGO.

PRICES of CATTLE at CHICAGO per Cwt. (Live Weight) in the under-mentioned Months of 1897.

Months.	Good Dressed Beef and Shipping Steers.	Export Cattle.	Extra Prime Cattle.
1897.	*s.* *d.* to *s.* *d.*	*s.* *d.* to *s.* *d.*	*s.* *d.* to *s.* *d.*
September -	21 6 to 24 6	21 6 to 25 0	25 0 to 26 2
October - -	19 7 ,, 23 10	20 6 ,, 24 3	23 4 ,, 25 8
November -	19 7 ,, 23 7	20 1 ,, 24 6	23 10 ,, 26 2

Compiled from the Live Stock Reports issued by Messrs. Clay, Robinson, and Co., of the Union Stock Yards, Chicago, Illinois.

AVERAGE VALUES, per Cwt., of various Kinds of DEAD MEAT Imported into the United Kingdom from FOREIGN COUNTRIES and BRITISH POSSESSIONS in the under-mentioned Quarters of 1896 and 1897.

(*Computed from the Trade and Navigation Accounts.*)

PERIOD.	BEEF.		MUTTON.	PORK.		BACON.	HAMS.
	Fresh.	Salted.	Fresh.	Fresh.	Salted.		
	s. *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*
3rd Quarter, 1896 -	38 5	23 6	33 7	47 0	20 5	34 5	43 1
4th Quarter ,, -	36 11	23 8	31 3	45 7	22 10	35 6	45 7
1st Quarter 1897 -	39 4	25 9	27 4	44 11	23 4	33 5	41 9
2nd Quarter ,, -	40 1	23 10	32 0	43 11	20 10	35 11	43 5
3rd Quarter ,. -	37 2	24 7	30 9	43 3	20 3	35 10	43 5

AVERAGE PRICES of **British Corn** per Quarter of 8 imperial bushels,* computed from the Weekly Averages of Corn Returns from the 196 Returning Markets of ENGLAND AND WALES, pursuant to the Corn Returns Act, 1882, together with the QUANTITIES returned as sold at such Markets, in the under-noted periods of the Years 1897, 1896, and 1895.

QUARTER ENDED	PRICES.			QUANTITIES.		
	1897.	1896.	1895.	1897.	1896.	1895.
Wheat.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day	29 7	25 8	20 1	619,679	448,047	652,874
Midsummer	27 6	25 2	23 1	619,618	384,559	496,615
Michaelmas	30 4	23 7	23 11	635,698	505,988	361,223
Christmas	—	30 5	25 1	—	772,427	417,671
Barley.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day	24 0	22 5	21 6	784,713	955,902	1,035,588
Midsummer	21 4	21 4	20 3	78,488	92,739	79,936
Michaelmas	21 6	21 0	21 3	118,875	165,722	141,985
Christmas	—	27 1	24 10	—	2,177,499	2,169,067
Oats.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day	16 4	13 9	13 9	194,193	259,565	250,838
Midsummer	17 3	14 3	15 2	79,707	99,672	111,424
Michaelmas	17 10	14 6	15 1	75,824	94,383	88,312
Christmas	—	16 7	13 10	—	201,533	215,365

* Section 8 of the Corn Returns Act, 1882, provides that where returns of purchases of British Corn are made to the local inspector of Corn Returns in any other measure than the imperial bushel or by weight or by a weighed measure, that officer shall convert such returns into the imperial bushel, and in the case of weight or weighed measure the conversion is to be made at the rate of 60 imperial pounds for every bushel of wheat, 50 imperial pounds for every bushel of barley, and 39 imperial pounds for every bushel of oats.

II.—CORN PRICES :—HARVEST YEAR.

AVERAGE PRICES of **British Corn** per Quarter of 8 imperial bushels, computed from the Weekly Averages of Corn Returns from the 196 Returning Markets, together with the QUANTITIES returned as sold at such Markets during each of the Harvest Years ending 31st August 1890 to 1897.

HARVEST YEARS.	PRICES.			QUANTITIES.		
	Wheat.	Barley.	Oats.	Wheat.	Barley.	Oats.
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
1889-90	31 2	28 10	18 6	3,289,806	3,281,141	558,053
1890-91	35 5	28 0	19 1	3,496,788	3,659,382	602,887
1891-92	33 4	27 2	20 8	3,267,038	3,260,327	488,830
1892-93	26 8	24 10	18 9	2,676,227	3,383,094	547,412
1893-94	25 5	26 5	18 4	2,087,062	2,876,977	542,425
1894-95	21 5	21 5	14 8	2,180,959	3,136,415	693,121
1895-96	24 10	22 4	14 1	1,640,943	3,366,364	672,547
1896-97	28 8	23 2	16 9	2,597,268	3,200,612	551,912

AVERAGE PRICES of **British Corn**, per Quarter of 8 imperial bushels, computed from the Returns received under the Corn Returns Act, 1882, in each of the under-mentioned Weeks in 1897, and in the corresponding Weeks in 1896 and 1895.

Weeks ended *(in 1897)*.	Wheat.			Barley.			Oats.		
	1897.	1896.	1895.	1897.	1896.	1895.	1897.	1896.	1895.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Jan. 2 -	30 6	25 2	20 4	24 8	24 7	21 5	16 2	13 10	14 2
,, 9 -	31 1	25 4	20 8	25 5	23 11	21 3	16 3	13 9	13 9
,, 16 -	31 8	25 10	20 8	24 10	23 6	21 8	16 5	13 11	14 0
,, 23 -	31 7	26 1	20 9	25 5	23 7	21 11	16 6	13 10	13 10
,, 30 -	31 3	26 3	20 6	24 7	23 1	21 5	16 8	14 1	13 10
Feb. 6 -	30 7	26 4	19 11	24 10	22 5	21 8	16 7	14 0	13 6
,, 13 -	29 8	26 7	19 10	24 8	21 11	21 10	16 6	14 0	13 8
,, 20 -	28 11	26 3	19 10	23 9	21 10	22 2	16 5	13 9	13 9
,, 27 -	28 2	25 6	19 10	23 8	21 10	21 9	16 3	13 10	14 0
Mar. 6 -	28 3	25 4	19 9	23 0	21 5	21 6	16 3	13 8	13 9
,, 13 -	27 11	25 5	19 9	22 11	21 3	21 7	16 2	13 10	13 8
,, 20 -	27 11	25 1	20 0	22 8	21 1	20 10	16 2	13 9	13 10
,, 27 -	27 9	24 10	20 3	22 5	21 4	20 10	16 3	13 4	14 0
Apl. 3 -	27 10	24 7	20 4	22 3	21 10	20 11	16 3	13 3	14 5
,, 10 -	27 8	24 6	20 4	22 7	21 0	21 3	16 6	13 1	13 11
,, 17 -	27 0	24 11	20 6	23 0	23 6	21 2	16 3	14 0	14 5
,, 24 -	26 6	25 6	20 9	20 7	21 0	20 8	16 7	13 11	14 2
May 1 -	27 9	25 8	21 4	20 5	22 6	20 5	17 3	14 3	14 8
,, 8 -	28 4	25 7	22 4	21 5	21 0	20 8	16 11	14 4	15 3
,, 15 -	27 11	25 7	22 10	20 2	21 0	20 6	17 7	14 5	15 3
,, 22 -	28 1	25 6	23 5	19 10	21 8	20 1	17 9	14 6	15 9
,, 29 -	28 2	25 4	24 5	21 3	21 5	19 4	17 10	14 10	15 10
June 5 -	27 10	25 5	25 9	20 8	21 6	19 9	17 9	14 8	15 10
,, 12 -	27 4	25 1	26 2	22 8	19 3	19 4	17 11	14 9	15 11
,, 19 -	27 0	25 1	26 5	23 9	22 8	19 5	18 0	15 1	16 1
,, 26 -	27 0	24 10	26 1	19 9	19 5	20 3	18 6	14 10	16 7
July 3 -	27 1	24 9	25 7	18 10	16 2	19 9	18 7	15 0	16 4
,, 10 -	27 4	24 7	25 0	17 4	18 11	20 8	18 8	14 9	15 7
,, 17 -	27 7	24 2	24 4	17 6	18 3	18 6	18 3	15 4	16 6
,, 24 -	28 1	24 0	24 1	18 10	19 8	19 10	18 11	15 0	15 11
,, 31 -	28 10	23 8	24 2	17 10	19 7	18 2	19 0	14 10	15 9
Aug. 7 -	29 5	23 6	24 3	17 9	19 5	20 0	18 11	14 9	16 5
,, 14 -	29 8	22 11	24 6	19 0	21 1	19 3	17 4	14 6	16 1
,, 21 -	30 4	22 4	24 5	19 2	21 11	20 8	17 2	14 3	15 7
,, 28 -	31 8	22 5	23 10	22 5	21 10	23 5	17 1	13 7	14 5
Sept. 4 -	33 7	23 1	23 1	25 11	21 11	23 4	17 0	13 11	14 4
,, 11 -	33 1	23 9	22 10	27 4	23 4	23 11	17 3	14 1	13 8
,, 18 -	33 10	24 0	22 7	28 11	24 8	24 2	17 0	14 6	13 3
,, 25 -	33 11	24 4	23 0	29 7	26 3	24 8	16 8	14 1	13 2
Oct. 2 -	33 4	25 2	23 6	29 10	28 7	25 1	16 4	14 9	13 6
,, 9 -	32 1	26 7	24 3	28 9	29 5	25 7	16 0	15 3	13 4
,, 16 -	31 10	27 10	24 11	28 3	29 7	25 8	16 1	15 9	13 5
,, 23 -	32 2	28 11	25 5	27 5	28 6	25 4	16 2	16 0	13 7
,, 30 -	32 10	30 9	25 11	27 5	28 3	25 6	16 0	17 3	13 10
Nov. 6 -	33 5	31 6	26 4	26 10	27 5	25 4	16 5	17 6	14 3
,, 13 -	34 0	31 9	26 1	26 3	27 3	25 1	16 3	17 7	14 4
,, 20 -	33 11	32 11	25 7	26 2	26 8	25 1	16 5	17 7	14 4
,, 27 -	33 8	33 4	25 2	25 9	26 9	24 7	16 8	17 7	14 3
Dec. 4 -	33 9	32 8	24 11	25 10	26 2	24 5	16 9	17 0	14 1
,, 11 -	33 9	32 2	24 9	26 0	25 4	23 11	16 6	16 8	13 11

AVERAGE VALUE per IMPERIAL QUARTER of WHEAT IMPORTED into the UNITED KINGDOM from the under-mentioned Foreign Countries and British Possessions in the Second and Third Quarters of 1897.

COUNTRIES from which Exported.	Average Value per Imperial Quarter.	
	Second Quarter. 1897.	Third Quarter, 1897.
	s. *d.*	*s.* *d.*
ARGENTINE REPUBLIC	28 6	—
CHILE	29 11	32 2
ROUMANIA	26 11	—
RUSSIA	28 5	30 9
TURKEY	28 4	32 0
U.S. OF AMERICA { Atlantic	28 11	33 2
U.S. OF AMERICA { Pacific	29 4	34 7
INDIA, BRITISH	—	35 5
NORTH AMERICA, BRITISH	29 7	32 1

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER in FRANCE and ENGLAND and WALES in the under-mentioned Months of 1897.

MONTH.	FRANCE.	ENGLAND.
WHEAT.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
September	47 11	33 7
October	48 2	32 5
November	48 10	33 9
BARLEY.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
September	22 9	27 11
October	23 0	28 4
November	23 5	26 3
OATS.		
1897.	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
September	18 5	16 11
October	18 8	16 1
November	19 1	16 5

Note.—The prices of French grain have been compiled from the official weekly averages published in the *Journal d'Agriculture Pratique*. The prices of British grain are official averages based on the weekly returns furnished under the Corn Returns Act, 1882.

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER in BELGIUM in the under-mentioned Months of 1897.

Month.	Wheat.	Barley.	Oats.
1897.	s. d.	s. d.	s. d.
January	29 4	21 3	18 1
February	29 2	20 11	18 2
March	28 4	20 8	18 2
April	28 0	20 3	18 5
May	29 1	20 9	18 7
June	28 10	20 3	18 11
July	29 5	19 8	19 1
August	34 0	19 4	18 2
September	35 2	20 9	17 5

The above prices have been compiled from the official monthly averages published in the *Moniteur Belge*.

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER at the under-mentioned Markets in the under-mentioned Months of 1897.

Month.	London.	Paris.	Breslau.
	WHEAT.		
1897.	Per Qr.	Per Qr.	Per Qr.
	s. d.	*s. d.*	*s. d.*
September	34 5	48 5	38 7
October	34 8	48 0	35 4
November	35 4	48 3	—
	BARLEY.		
1897.	Per Qr.	Per Qr.	Per Qr.
	s. d.	*s. d.*	*s. d.*
September	32 3	23 3	24 7
October	32 5	22 11	24 11
November	30 5	22 1	—
	OATS.		
1897.	Per Qr.	Per Qr.	Per Qr.
	s. d.	*s. d.*	*s. d.*
September	19 3	17 8	20 5
October	17 3	17 7	17 10
November	17 9	18 5	—

Note.—The London quotation represents the price of British corn as returned under the Corn Returns Act, 1882; the price of grain in Paris is the official average price of French wheat in that city; the quotations shown for Breslau represent the prices of grain of good merchantable quality.

III.—PRICES OF BUTTER, MARGARINE, AND CHEESE.

MEAN WHOLESALE PRICES of BUTTER, MARGARINE, and CHEESE, in the under-mentioned Months of 1897.

(Compiled from the *Grocer*.)

DESCRIPTION.	September.	October.	November.
	Per Cwt.	Per Cwt.	Per Cwt.
BUTTER:	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*
Cork, 1sts	89 0 —	87 0 —	86 0 —
,, 2nds	84 0 —	82 0 —	78 0 —
,, 3rds	78 0 —	76 0 —	71 0 —
,, 4ths	59 0 —	55 0 —	56 0 —
Friesland	92 0 to 94 0	93 0 to 96 0	95 0 to 98 0
Dutch Factories	96 0 ,, 98 0	96 0 ,, 99 0	97 0 ,, 101 0
French Baskets	93 0 ,, 101 0	94 0 ,, 104 0	97 0 ,, 104 0
,, Crocks and Firkins	86 0 ,, 91 0	86 0 ,, 91 0	85 0 ,, 93 0
,, 2nds and 3rds	80 0 ,, 84 0	79 0 ,, 83 0	78 0 ,, 83 0
Danish and Swedish	111 0 ,, 115 0	102 0 ,, 108 0	111 0 ,, 115 0
Finnish	86 0 ,, 102 0	80 0 ,, 97 0	86 0 ,, 103 0
Russian	81 0 ,, 95 0	76 0 ,, 90 0	78 0 ,, 99 0
Canadian and States	56 0 ,, 103 0	56 0 ,, 100 0	56 0 ,, 99 0
Argentine	—	105 0 ,, 110 0	103 0 ,, 107 0
Fresh Rolls (Foreign) per doz.	9 0 ,, 13 0	9 6 ,, 13 6	9 6 ,, 13 6
MARGARINE:			
Margarine	27 0 ,, 56 0	28 0 ,, 56 0	28 0 ,, 56 0
Mixtures	49 0 ,, 80 0	50 0 ,, 80 0	51 0 ,, 80 0
CHEESE:			
Cheddar	57 0 ,, 69 0	53 0 ,, 73 0	52 0 ,, 72 0
Somerset	55 0 ,, 66 0	55 0 ,, 66 0	54 0 ,, 66 0
Cheshire	66 0 ,, 73 0	65 0 ,, 76 0	60 0 ,, 76 0
Wiltshire	59 0 ,, 64 0	60 0 ,, 64 0	60 0 ,, 62 0
Double Gloucester	49 0 ,, 59 0	50 0 ,, 60 0	50 0 ,, 60 0
Derby	49 0 ,, 55 0	50 0 ,, 54 0	—

WEEKLY PRICES (WHOLESALE) of VEGETABLES and FRUIT at COVENT GARDEN MARKET.

(Compiled from the *Gardeners' Chronicle*.)

—	Week ending			
	4th Nov.	11th Nov.	18th Nov.	25th Nov.
VEGETABLES—	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*
Artichokes, Globe, per dozen	3 0 to 3 6	3 0 to 3 6	3 0 to 3 6	4 0 to 4 6
Beans, French, Channel Islands, per lb.	0 9 —	0 8 —	0 8 —	0 8 ,, 1 0
Beetroots, per bushel	1 3 ,, 1 6	1 3 ,, 1 6	1 3 ,, 1 6	1 3 ,, 1 6
Capsicum, Chili, per 100	1 6 —	1 6 —	1 6 —	1 6 —
Cauliflowers, per tally (5 doz.)	3 0 ,, 5 0	5 0 ,, 6 0	5 0 ,, 6 0	5 0 ,, 6 0
Cucumbers, home-grown, select, per dozen	2 0 ,, 3 0	2 0 ,, 3 0	3 0 ,, 3 6	4 0 ,, 5 0
Cucumbers, seconds, per dozen	0 9 ,, 1 0	0 9 ,, 1 0	— —	— —
Garlic, per lb.	0 2 —	0 2 —	0 2 —	0 2 —
Horseradish (German), per bundle	1 4 ,, 1 6	1 4 ,, 1 6	1 4 ,, 1 6	1 0 ,, 1 3
Mushrooms, Indoor, per lb.	0 9 ,, 1 0	0 9 ,, 1 0	0 8 ,, 0 10	0 8 ,, 0 10
Onions (pickling), per pocket	2 0 ,, 3 0	2 0 ,, 3 0	2 0 ,, 3 0	2 0 ,, 3 0
Onions (pickling), skinned, per ½ bushel	2 6 ,, 3 0	2 6 ,, 3 0	2 6 ,, 3 0	— —
Onions, Dutch, per bag	3 0 —	3 0 —	3 0 —	3 0 —
Onions, Albanian, per bag	5 6 ,, 6 0	4 6 —	4 6 —	4 6 ,, 5 0
Potatoes, Hebrons, per ton	80 0 ,, 105 0	80 0 ,, 105 0	— —	— —
Potatoes, Snowdrops, per ton	80 0 ,, 105 0	80 0 ,, 105 0	80 0 ,, 110 0	85 0 ,, 110 0
Potatoes, Saxons, per ton	75 0 ,, 100 0	80 0 ,, 100 0	80 0 ,, 95 0	80 0 ,, 95 0
Potatoes, Maincrops, per ton	75 0 ,, 100 0	80 0 ,, 100 0	80 0 ,, 100 0	80 0 ,, 100 0
Potatoes, Giants, per ton	75 0 ,, 85 0	75 0 ,, 85 0	— —	— —
Potatoes, Magnums, per ton	75 0 ,, 85 0	75 0 ,, 85 0	— —	— —
Potatoes, Blacklands, per ton	65 0 ,, 72 6	65 0 ,, 75 0	70 0 ,, 75 0	70 0 ,, 75 0
Radish (long scarlet), Channel Islands, per 12 bunches	— —	0 6 ,, 0 8	0 6 ,, 0 8	0 6 ,, 0 8
Salad, small, per dozen punnets	1 6 —	1 6 ,, —	1 6 —	1 6 —
Shallots, per lb.	0 2 —	0 2 —	0 2 —	0 2 —
Sprouts, per ½ bushel	1 0 ,, 1 3	1 0 ,, 1 3	1 0 ,, 1 3	0 9 ,, 1 0
Tomatoes, selected, per doz. lbs.	5 0 ,, 6 0	3 0 ,, 4 0	3 0 ,, 4 0	6 0 ,, 7 0
Tomatoes, medium, per doz. lbs.	3 6 ,, 4 0	2 0 ,, 3 0	2 0 ,, 3 0	3 0 ,, 4 0
Tomatoes, seconds, per doz. lbs.	1 0 ,, 1 6	1 0 ,, 1 6	1 0 ,, 1 6	1 6 ,, 2 0
Tomatoes, Canary Islands, per case, 12 lbs.	3 6 ,, 5 0	3 6 ,, 5 0	— —	— —
FRUIT—				
Apples (Cox's Orange), per bushel	14 0 ,, 16 0	14 0 ,, 16 0	14 0 ,, 16 0	— —
Apples (Ribstons), per bushel	14 0 ,, 16 0	14 0 ,, 16 0	14 0 ,, 16 0	— —
Apples (Blenheim Orange), selected, per bushel	9 0 ,, 10 0	9 0 ,, 10 0	9 0 ,, 10 0	9 0 ,, 10 0
Apples (Wellingtons), selected, per bushel	9 0 ,, 10 0	9 0 ,, 10 0	9 0 ,, 10 0	8 0 ,, 9 0
Apples, common varieties, per bushel	2 6 —	2 6 ,, 4 0	2 6 ,, 4 0	2 6 ,, 4 0
Grapes, Gros Colmar, per lb.	1 6 ,, 2 0	1 6 ,, 2 0	1 6 ,, 2 0	1 6 ,, 2 0
Grapes, Gros Colmar, second quality, per lb.	0 8 ,, 0 10	0 8 ,, 0 10	0 8 ,, 0 10	1 0 —
Grapes, Gros Maroc, per lb.	1 0 ,, 1 6	1 0 ,, 1 6	1 0 ,, 1 6	— —
Grapes, Alicantes, per lb.	1 0 ,, 1 3	1 0 ,, 1 3	1 0 ,, 1 3	1 6 ,, 1 9
Grapes, Alicantes, second quality, per lb.	0 6 ,, 0 8	0 6 ,, 0 8	0 6 ,, 0 8	0 10 ,, 1 0
Grapes, Hamburghs, selected, per lb.	1 0 ,, 1 6	1 0 ,, 1 6	1 0 ,, 1 6	— —
Grapes, Hamburghs, second quality, per lb.	0 8 ,, 0 9	0 8 ,, 0 9	0 8 ,, 0 9	— —
Grapes, Muscats, "Cannon Hall," per lb.	2 0 ,, 4 0	2 0 ,, 4 0	2 0 ,, 4 0	2 6 ,, 5 0
Grapes, Muscats, selected, per lb.	2 0 ,, 2 6	2 0 ,, 2 6	2 0 ,, 2 6	3 0 ,, 3 6
Grapes, Muscats, second quality, per lb.	0 9 ,, 1 3	0 9 ,, 1 3	0 9 ,, 1 3	1 6 ,, 2 0
Nuts, Cobs, per 100 lbs.	22 6 ,, 25 0	22 6 ,, 25 0	22 6 ,, 25 0	21 0 ,, 22 6
Pears, small, per bushel	2 0 ,, 3 0	3 0 ,, 4 0	3 0 ,, 4 0	— —
Pears, stewing, per bushel	4 0 ,, 8 0	4 0 ,, 8 0	4 0 ,, 8 0	4 0 ,, 6 0
Pears, Californian, various, per case	— —	7 0 ,, 16 0	7 0 ,, 16 0	— —
Pineapples, St. Michael, cases containing 6 to 8	4 6 ,, 5 0	4 6 ,, 5 0	4 6 ,, 5 0	3 6 ,, 4 6
Pineapples, St. Michael, cases containing 10 to 12	1 6 ,, 2 0	1 6 ,, 2 0	1 6 ,, 2 0	1 3 ,, 1 9

AVERAGE PRICES OF ENGLISH WOOL, per pack of 240 lbs., in the under-mentioned Months of 1897.

(Compiled from the *Economist.*)

DESCRIPTION.	SEPTEMBER.	OCTOBER.	NOVEMBER.
	£ s. £ s.	£ s. £ s.	£ s. £ s.
South Down - - -	8 10 to 10 0	8 10 to 10 0	8 10 to 10 0
Half breds - - -	8 10 ,, 9 15	8 10 ,, 9 15	8 10 ,, 9 15
Leicester - - - -	8 10 ,, 9 15	8 10 ,, 9 15	8 10 ,, 9 15
Kent Fleeces - - -	8 0 ,, 9 10	8 0 ,, 9 10	8 0 ,, 9 10

DISEASES OF ANIMALS IN GREAT BRITAIN.

NUMBER of OUTBREAKS of **Pleuro-Pneumonia**, and of **Swine-Fever**, with the Number of CATTLE and SWINE Slaughtered by order of the Board of Agriculture, in Great Britain in each of the under-mentioned periods.

QUARTER ENDED	**Pleuro-Pneumonia.**			**Swine-Fever.**	
	OUTBREAKS Confirmed.	CATTLE found Diseased.	CATTLE Slaughtered as having been exposed to Infection.	OUTBREAKS Confirmed.	SWINE Slaughtered as Diseased, or as having been exposed to Infection.
	No.	*No.*	*No.*	*No.*	*No.*
September 1896 -	—	—	—	1,104	19,329
December 1896 -	—	—	—	815	15,806
March 1897 - -	2	14	450	785	13,544
June 1897 - -	3	25	197	700	13,131
September 1897 -	1	4	71	392	8,026

NUMBER of OUTBREAKS reported as having taken place, and Number of ANIMALS returned as having been ATTACKED by ANTHRAX, GLANDERS, and RABIES in Great Britain in each of the under-mentioned periods.

QUARTER ENDED	**Anthrax.**		**Glanders** (including **Farcy**).		**Rabies.**	
	OUT-BREAKS RE-PORTED.	ANIMALS AT-TACKED.	OUT-BREAKS RE-PORTED.	ANIMALS AT-TACKED.	CASES REPORTED.	
					DOGS.	OTHER ANIMALS.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
September 1896	108	205	234	339	66	—
December 1896	118	219	213	331	45	1
March 1897 -	129	306	196	341	49	10
June 1897 -	109	201	230	393	39	—
September 1897	97	174	251	438	41	4

DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of **Pleuro-Pneumonia** and of **Swine-Fever,** with the Number of CATTLE and SWINE Slaughtered by order of the Lord Lieutenant and Privy Council in Ireland, in each of the under-mentioned periods.

QUARTER ENDED	**Pleuro-Pneumonia.**			**Swine-Fever.**	
	OUT-BREAKS Confirmed.	CATTLE found Diseased.	CATTLE Slaughtered as having been exposed to Infection.	OUT-BREAKS Con-firmed.	SWINE Slaughtered as Diseased, or as having been exposed to Infection.
	No.	*No.*	*No.*	*No.*	*No.*
September 1896 -	—	—	—	162	850
December 1896 -	—	—	—	60	2,794
March 1897 - -	—	—	142	122	1,149
June 1897 - -	—	—	—	136	1,571
September 1897 -	—	—	—	120	749

NUMBER of OUTBREAKS reported as having taken place, and Number of ANIMALS returned as having been ATTACKED by ANTHRAX, GLANDERS, and RABIES in Ireland in each of the under-mentioned periods.

QUARTER ENDED	Anthrax.		Glanders (including Farcy).		Rabies.	
					Cases Reported.	
	Out-breaks Reported.	Animals Attacked.	Out-breaks Reported.	Animals Attacked.	Dogs.	Other Animals.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
Sept. 1896 -	—	—	3	4	114	50
Dec. 1896 -	—	—	—	1	74	29
March 1897 -	—	—	—	—	118	19
June 1897 -	1	1	1	2	139	41
Sept. 1897 -	—	—	1	1	110	29

POST OFFICE SAVINGS BANKS, WITH GOVERNMENT SECURITY.

ADVANTAGES OFFERED FOR LIFE INSURANCE.

LIFE INSURANCES from £5 to £100 can be obtained through the Post Office Savings Bank by any person between fourteen and sixty-five years of age. Children between eight and fourteen years of age may be insured for £5.

OLD AGE INSURANCES can be secured payable at 55, 60, or 65 years of age. In case of death, the Insurance Money is paid to the legal representatives.

GOVERNMENT SECURITY.—Persons insured have direct Government security.

PROPOSAL FORMS can be obtained at any Post Office Savings Bank, where the charges can also be ascertained.

EVIDENCE OF AGE.—A statement of age is sufficient if the Controller of the Savings Bank Department can verify it

from the records of the Registrar-General, London, and thus the cost of a certificate of birth is saved. A simple form for the purpose can be obtained at any Post Office Savings Bank.

MEDICAL CERTIFICATES can be dispensed with for Insurances up to £25 inclusive.

PREMIUMS are payable by transfers from Savings Bank deposit accounts, and deposits can be made for the purpose at any Post Office Savings Bank. When the balance in the account is insufficient, the depositor will be informed accordingly in time to make a deposit. By means of the Penny Stamp Slips the provision can be made in sums of one penny at a time.

FRIENDLY SOCIETIES.—Members can pay their premiums through their Society, if the Society is willing to undertake the collection.

RESIDENCE ABROAD.—Permission is granted to persons over thirty years of age, who have been insured five years, to reside in any part of the world without the payment of any extra premium.

LAPSED INSURANCES—MONEY NOT LOST.—If after paying two annual premiums the Insurance is discontinued, a surrender value is payable, or a "paid up" policy is issued for such an amount of Insurance as the premiums already paid may justify.

NOMINATIONS.—Any insured person over sixteen years of age can, without any expense, nominate a person to receive the amount of Insurance money at death.

PAYMENT AT DEATH.—The amount insured is paid immediately evidence of death is furnished. A form for obtaining a cheap certificate of death, at the reduced charge of one shilling, can be obtained from the Controller of the Savings Bank Department.

FACILITIES FOR INVESTING IN THE FUNDS.

INVESTMENTS IN GOVERNMENT STOCK can be made through any Post Office Savings Bank of sums from one shilling to £200 Stock in any year ending 31st December until the maximum of £500 Stock has been reached; and money can be deposited

for this purpose irrespective of ordinary Savings Bank deposits. The dividends are collected by the Post Office and added to the depositors' accounts without charge.

SALES.—A depositor who buys Stock in this way can sell the whole or a part of it at any time through the Post Office Savings Bank.

COMMISSION.—The commission on a purchase or a sale of Stock is 9d. for Stock not exceeding £25, and 6d. on each further £25 up to £100. Beyond this it is 6d. more for each additional £100 Stock or part of £100 Stock.

FURTHER PROVISIONS IN REGARD TO STOCK.—A depositor may, at a small cost, transfer Stock into his name at the Bank of England, or obtain a Stock Certificate with dividend coupons annexed.

ADVANTAGES OFFERED FOR OLD AGE PENSIONS.

PROVISION FOR OLD AGE can be made by buying Savings Bank Deferred Annuities from £1 to £100 to begin at any age selected.

RETURN OF PURCHASE MONEY.—The Premiums for Deferred Annuities can be returned on application, or on Death before the Annuity begins, if the Contract is taken out on these conditions.

IMMEDIATE PENSIONS.—Annuities to begin at once, of any amount from £1 to £100 a year, can be bought through the Post Office Savings Bank. The Purchase Money is payable in a lump sum which is not returnable, and the Pensions are payable half-yearly. On the death of an annuitant a sum equal to one-fourth part of the annuity is payable to the representatives, if claimed within two years.

PROCEDURE.—A simple form of Proposal can be obtained at any Post Office Savings Bank. When filled up the forms will be forwarded by the local Postmaster to the Chief Office, London, and a Contract will be issued when the first premium has been paid. Annuity Premiums are payable in the same way as Insurance Premiums, namely, by transfers from Savings Bank accounts.

OLD AGE PENSIONS.—IMMEDIATE LIFE ANNUITIES.

This Table shows the cost of an Immediate Life Annuity of £1, and an Annuity of a larger amount costs a larger sum in exact proportion. For instance, a Pension of £10 a year would cost ten times the amount given below.

AGE at time of Purchase.	Males. Cost of an Immediate Annuity of £1.			Females. Cost of an Immediate Annuity of £1.		
	£	s.	d.	£	s.	d.
5 and under 6	25	19	0	27	12	6
6 ,, 7	25	15	1	27	9	1
7 ,, 8	25	11	1	27	5	8
8 ,, 9	25	7	0	27	2	2
9 ,, 10	25	2	11	26	18	8
10 ,, 11	24	18	10	26	15	1
11 ,, 12	24	14	9	26	11	6
12 ,, 13	24	10	6	26	7	10
13 ,, 14	24	6	4	26	4	1
14 ,, 15	24	2	1	26	0	4
15 ,, 16	23	17	10	25	16	6
16 ,, 17	23	13	6	25	12	7
17 ,, 18	23	9	1	25	8	8
18 ,, 19	23	4	9	25	4	8
19 ,, 20	23	0	4	25	0	8
20 ,, 21	22	15	10	24	16	6
21 ,, 22	22	11	4	24	12	4
22 ,, 23	22	6	9	24	8	1
23 ,, 24	22	2	3	24	3	10
24 ,, 25	21	17	7	23	19	5
25 ,, 26	21	12	11	23	15	0
26 ,, 27	21	8	3	23	10	6
27 ,, 28	21	3	6	23	5	11
28 ,, 29	20	18	9	23	1	3
29 ,, 30	20	13	11	22	16	6
30 ,, 31	20	9	1	22	11	8
31 ,, 32	20	4	2	22	6	9
32 ,, 33	19	19	2	22	1	9
33 ,, 34	19	14	2	21	16	7
34 ,, 35	19	9	2	21	11	5
35 ,, 36	19	4	1	21	6	2
36 ,, 37	18	18	11	21	0	9
37 ,, 38	18	13	9	20	15	3
38 ,, 39	18	8	6	20	9	7
39 ,, 40	18	3	2	20	3	11
40 ,, 41	17	17	10	19	18	0
41 ,, 42	17	12	4	19	12	1
42 ,, 43	17	6	10	19	5	11
43 ,, 44	17	1	4	18	19	8
44 and under 45	16	15	8	18	13	3
45 ,, 46	16	9	11	18	6	9
46 ,, 47	16	4	2	18	0	0
47 ,, 48	15	18	3	17	13	2
48 ,, 49	15	12	3	17	6	1
49 ,, 50	15	6	1	16	18	11
50 ,, 51	14	19	11	16	11	9
51 ,, 52	14	13	6	16	4	7
52 ,, 53	14	7	1	15	17	4
53 ,, 54	14	0	5	15	9	11
54 ,, 55	13	13	8	15	2	4
55 ,, 56	13	6	9	14	14	9
56 ,, 57	12	19	8	14	6	11
57 ,, 58	12	12	5	13	19	0
58 ,, 59	12	4	11	13	11	1
59 ,, 60	11	17	4	13	3	1
60 ,, 61	11	9	8	12	15	1
61 ,, 62	11	2	2	12	7	0
62 ,, 63	10	14	11	11	19	0
63 ,, 64	10	7	8	11	11	0
64 ,, 65	10	0	6	11	2	11
65 ,, 66	9	13	4	10	14	7
66 ,, 67	9	6	4	10	6	4
67 ,, 68	8	19	7	9	18	1
68 ,, 69	8	12	10	9	9	10
69 ,, 70	8	6	2	9	1	10
70 ,, 71	7	19	5	8	14	2
71 ,, 72	7	12	10	8	6	10
72 ,, 73	7	6	4	7	19	10
73 ,, 74	7	0	1	7	13	0
74 ,, 75	6	14	1	7	6	4
75 ,, 76	6	8	4	6	19	10
76 ,, 77	6	2	8	6	13	7
77 ,, 78	5	17	4	6	7	5
78 ,, 79	5	12	3	6	1	6
79 ,, 80	5	7	2	5	15	9
80 or any greater age.	5	2	4	5	10	3

OLD AGE PENSIONS.—DEFERRED LIFE ANNUITIES.

The Annuity Tables below give the cost of an Annuity of £1, and an Annuity of a larger amount costs a larger sum in exact proportion. For instance, a Pension of £10 a year would cost ten times the amount given below. In this class of Annuities the Purchase Money will be returned on application, or on the death of the nominee, if an instalment of the Annuity shall not have become due. These Pensions can be Deferred any number of years from 10 to 50, and any cost not given below will be furnished on application to the Controller, Post Office Savings Bank, London.

Purchase Money Returnable Scale.

Age at time of Purchase.	Cost of an Annuity of £1 payable after the expiration of 10 YEARS.				Cost of an Annuity of £1 payable after the expiration of 20 YEARS.			
	Males.		Females.		Males.		Females.	
	In 11 Yearly Sums of	In one Sum at time of Purchase.	In 11 Yearly Sums of	In one Sum at time of Purchase.	In 21 Yearly Sums of	In one Sum at time of Purchase.	In 21 Yearly Sums of	In one Sum at time of Purchase.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
21 and under 22	1 12 5	15 15 9	1 15 10	17 9 0	0 13 0	10 15 1	0 14 6	11 19 3
22 ,, 23	1 12 0	15 11 10	1 15 5	17 5 1	0 12 10	10 11 8	0 14 3	11 15 6
23 ,, 24	1 11 7	15 7 11	1 15 0	17 1 1	0 12 7	10 8 4	0 14 0	11 11 9
24 ,, 25	1 11 3	15 4 0	1 14 7	16 17 0	0 12 5	10 4 10	0 13 9	11 7 10
25 ,, 26	1 10 10	15 0 0	1 14 2	16 12 11	0 12 2	10 1 4	0 13 6	11 3 10
26 ,, 27	1 10 5	14 16 0	1 13 9	16 8 8	0 12 0	9 17 10	0 13 3	10 19 9
27 ,, 28	1 10 0	14 11 11	1 13 4	16 4 4	0 11 9	9 14 3	0 13 0	10 15 6
28 ,, 29	1 9 7	14 7 10	1 12 10	16 0 0	0 11 6	9 10 7	0 12 9	10 11 3
29 ,, 30	1 9 2	14 3 9	1 12 5	15 15 6	0 11 4	9 6 10	0 12 6	10 6 10
30 ,, 31	1 8 8	13 19 6	1 11 11	15 10 11	0 11 1	9 3 1	0 12 3	10 2 6
31 ,, 32	1 8 3	13 15 3	1 11 5	15 6 3	0 10 10	8 19 2	0 12 0	9 18 1
32 ,, 33	1 7 10	13 11 0	1 10 11	15 1 6	0 10 7	8 15 2	0 11 9	9 13 8
33 ,, 34	1 7 5	13 6 8	1 10 5	14 16 7	0 10 4	8 11 2	0 11 5	9 9 2
34 ,, 35	1 6 11	13 2 3	1 9 11	14 11 7	0 10 1	8 7 0	0 11 2	9 4 6
35 ,, 36	1 6 6	12 17 9	1 9 5	14 6 6	0 9 10	8 2 10	0 10 11	8 19 11
36 ,, 37	1 6 0	12 13 3	1 8 11	14 1 3	0 9 7	7 18 6	0 10 7	8 15 2
37 ,, 38	1 5 6	12 8 7	1 8 4	13 15 10	0 9 4	7 14 1	0 10 4	8 10 4
38 ,, 39	1 5 1	12 3 11	1 7 9	13 10 4	0 9 1	7 9 6	0 10 0	8 5 5
39 ,, 40	1 4 7	11 19 2	1 7 2	13 4 10	0 8 9	7 4 10	0 9 9	8 0 7
40 ,, 41	1 4 1	11 14 4	1 6 7	12 19 2	0 8 6	7 0 2	0 9 5	7 15 8
41 ,, 42	1 3 7	11 9 4	1 6 0	12 13 7	0 8 3	6 15 7	0 9 2	7 10 9
42 ,, 43	1 3 0	11 4 3	1 5 6	12 7 11	0 7 11	6 11 2	0 8 10	7 5 10
43 ,, 44	1 2 6	10 19 1	1 4 10	12 2 1	0 7 8	6 6 9	0 8 6	7 1 0
44 ,, 45	1 2 0	10 13 9	1 4 3	11 16 3	0 7 5	6 2 4	0 8 3	6 16 0
45 ,, 46	1 1 5	10 8 4	1 3 8	11 10 3	0 7 2	5 18 0	0 7 11	6 11 0

Purchase Money not Returnable Scale.

21 and under 22	1 10 3	14 2 4	1 14 0	16 1 5	0 11 0	8 5 11	0 12 11	9 19 2
22 ,, 23	1 9 10	13 18 1	1 13 7	15 17 3	0 10 10	8 2 2	0 12 8	9 15 4
23 ,, 24	1 9 5	13 13 8	1 13 2	15 13 1	0 10 7	7 18 5	0 12 5	9 11 5
24 ,, 25	1 8 11	13 9 4	1 12 9	15 8 10	0 10 4	7 14 7	0 12 2	9 7 6
25 ,, 26	1 8 6	13 4 10	1 12 4	15 4 6	0 10 2	7 10 9	0 11 11	9 3 6
26 ,, 27	1 8 1	13 0 5	1 11 10	15 0 1	0 9 11	7 6 11	0 11 8	8 19 5
27 ,, 28	1 7 8	12 15 11	1 11 5	14 15 7	0 9 8	7 3 1	0 11 5	8 15 3
28 ,, 29	1 7 2	12 11 5	1 10 11	14 11 1	0 9 5	6 19 2	0 11 2	8 11 0
29 , 30	1 6 9	12 6 10	1 10 6	14 6 5	0 9 3	6 15 4	0 10 11	8 6 9
30 ,, 31	1 6 3	12 2 3	1 10 0	14 1 9	0 9 0	6 11 4	0 10 8	8 2 5
31 ,, 32	1 5 10	11 17 8	1 9 6	13 16 11	0 8 9	6 7 5	0 10 5	7 17 11
32 ,, 33	1 5 4	11 13 0	1 9 0	13 12 1	0 8 6	6 3 6	0 10 1	7 13 5
33 ,, 34	1 4 11	11 8 3	1 8 6	13 7 2	0 8 3	5 19 6	0 9 10	7 8 10
34 ,, 35	1 4 5	11 3 6	1 8 0	13 2 1	0 8 0	5 15 6	0 9 6	7 4 2
35 ,, 36	1 3 11	10 18 9	1 7 6	12 16 11	0 7 9	5 11 5	0 9 3	6 19 5
36 ,, 37	1 3 5	10 13 11	1 6 11	12 11 8	0 7 6	5 7 5	0 8 11	6 14 8
37 ,, 38	1 3 0	10 9 1	1 6 5	12 6 4	0 7 3	5 3 4	0 8 8	6 9 10
38 ,, 39	1 2 6	10 4 2	1 5 10	12 0 10	0 7 0	4 19 2	0 8 4	6 4 11
39 ,, 40	1 2 0	9 19 2	1 5 3	11 15 3	0 6 9	4 15 1	0 8 0	6 0 0
40 ,, 41	1 1 6	9 14 2	1 4 8	11 9 7	0 6 6	4 10 10	0 7 9	5 14 11
41 ,, 42	1 0 11	9 9 1	1 4 1	11 3 9	0 6 2	4 6 8	0 7 5	5 9 10
42 ,, 43	1 0 5	9 4 0	1 3 5	10 17 9	0 5 11	4 2 5	0 7 1	5 4 9
43 ,, 44	0 19 11	8 18 10	1 2 10	10 11 9	0 5 8	3 18 1	0 6 9	4 19 7
44 ,, 45	0 19 4	8 13 7	1 2 2	10 5 6	0 5 4	3 13 9	0 6 5	4 14 4
45 ,, 46	0 18 10	8 8 3	1 1 6	9 19 3	0 5 1	3 9 5	0 6 1	4 9 1

LIST OF LEAFLETS ISSUED BY THE BOARD OF AGRICULTURE.

Number.	Title.
Leaflet No. 1	Mites on Currant and Nut Trees.
,, ,, 2	Vine and Raspberry Weevils.
,, ,, 3	The Turnip Fly or Flea.
,, ,, 4	Caterpillars on Fruit Trees.
,, ,, 5	The Mangel Wurzel Fly.
,, ,, 6	The Field Vole.
,, ,, 7	Autumn Catch Crops and Fodder Supply.
,, ,, 8	Farmers and Assessments to Local Rates.
,, ,, 9	Ensilage.
,, ,, 10	Wireworms.
,, ,, 11	The Daddy Longlegs.
,, ,, 12	The Gooseberry Saw-Fly.
,, ,, 13	Acorn Poisoning.
,, ,, 14	The Raspberry Moth.
,, ,, 15	The Apple Blossom Weevil.
,, ,, 16	The Apple Sucker.
,, ,, 17	Preservation of Commons.
,, ,, 18	Fertilisers and Feeding Stuffs Act, 1893.
,, ,, 19	Pea and Bean Weevil.
,, ,, 20	The Magpie Moth.
,, ,, 21	The Warble Fly.
,, ,, 22	The Diamond Back Moth.
,, ,, 23	Potato Disease.
,, ,, 24	The Ribbon Footed Corn-Fly.
,, ,, 25	The Cockchafer.
,, ,, 26	Farmers and the Income Tax.
,, ,, 27	Remission of Tithe Rentcharge.
,, ,, 28	Anthrax.
,, ,, 29	Swine Fever.
,, ,, 30	The Codlin Moth.
,, ,, 31	The Onion Fly.
,, ,, 32	Foul Brood or Bee Pest.
,, ,, 33	Surface Caterpillars.
,, ,, 34	The Woolly Aphis or American Blight
,, ,, 35	The Celery Fly.
,, ,, 36	Cultivation of Osiers.
,, ,, 37	Rabies.
,, ,, 38	The Carrot Fly.
,, ,, 39	Assessments to Land Tax.
,, ,, 40	The Kestrel or Windhover.
,, ,, 41	The Sparrow-hawk.
,, ,, 42	The Short-eared Owl.
,, ,, 43	Titmice.
,, ,, 44	The Common Lapwing or Plover.
,, ,, 45	The Starling.

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5 JAN. 93

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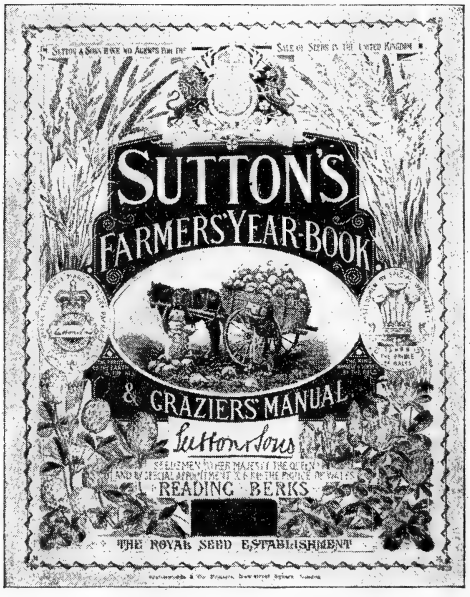
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The Journal

OF THE

BOARD OF AGRICULTURE

MARCH, 1898.

BRITISH MUSEUM NATURAL HISTORY

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BRITISH MUSEUM 29 MAR 1898 NATURAL HISTORY

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THE JOURNAL

OF THE

BOARD OF AGRICULTURE.

Vol. IV. No. 4. MARCH, 1898.

THE POTATO AND HAY CROPS OF 1897.

The December number of this Journal contained the preliminary estimates of the yield of the principal grain crops of Great Britain in 1897. It is now possible, as a further instalment of the complete Produce Returns for the year, to indicate the general nature of the estimates received by the Board of Agriculture as to the aggregate production and yield per acre of the potato and hay crops of the past season.

Dealing with the first of these, it will be observed that the total production of potatoes in Great Britain is placed at a lower figure than has ever before been recorded since the Produce Estimates were begun in 1884.

Potatoes.	Estimated Total Produce.		Estimated Yield per Acre.		Average Yield per Acre, 1887-96.
	1897.	1896.	1897.	1896.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
England - - -	1,896,000	2,539,000	5·38	6·35	6·06
Wales - - - -	166,000	218,000	5·10	6·45	5·82
Scotland - - -	546,000	805,000	4·55	6·20	5·76
Great Britain -	2,608,000	3,562,000	5·17	6·32	5·97

This result is, of course, partly due to the diminished acreage, which, as the statistics published last August showed,

reached only 505,000 acres as against 564,000 acres in 1896. The average yield per acre in 1897 was, however, a still more important factor in the reduction, as it was not only less by over a ton per acre than in the immediately preceding year, but less by 16 cwts. per acre than the average crop of potatoes which has been lifted in Great Britain in the ten years 1887-96 inclusive.

The acreage under potatoes has fluctuated considerably in Great Britain in the period for which produce returns are available: from a maximum of 590,000 acres in 1888 to 504,000 acres in 1894, when the area returned as under the crop was almost identical with that now shown for 1897. The average yield per acre, however, was 5·53 tons in 1894, while this was reduced to only 5·17 tons per acre in 1897, a yield which is even slightly under that of 1888, the season in which the largest area was devoted to the potato crop and the smallest yield per acre was recorded. The estimated yield in Wales and in Scotland in 1897 would appear by the above figures to have been less than in England, and although there are, as usual, a few counties where the estimates are above the average, it will be found, when the complete figures for counties are available, that the decline in production was a very general and wide-spread feature of the season.

If the results of the potato crop of 1897 were thus disappointing, the estimates of the yield of hay in Great Britain were on the contrary good. For clover hay, including that cut from artificial grasses, the average crop is given, as the accompanying figures show, at about a hundredweight and a half per acre over a ten years' average yield; while, compared with the crop of 1896, and despite some decrease in the large Scotch estimates of the preceding season, it is nearly 5 cwts. per acre above the yield of Great Britain as a whole in that year, the English excess over the crop of the immediately preceding year being upwards of 6 cwts. per acre, and that of the Welsh counties more than 7 cwts.

The acreage reserved for hay from clover and rotation grasses was 2,286,000 acres against 2,172,000 acres in 1896,

while the produce, as shown below, gave a crop greater by 27 per cent. than was harvested in Great Britain in 1896.

Hay cut from Clover and Rotation Grasses.	Estimated Total Produce.		Estimated Yield per Acre.		Average Yield per Acre, 1887-96.
	1897.	1896.	1897.	1896.	
	Tons.	*Tons.*	*Cwts.*	*Cwts.*	*Cwts.*
England - - -	2,434,000	1,806,000	28·75	22·55	27·37
Wales - - - -	248,000	161,000	25·26	18·17	22·21
Scotland - - -	638,000	657,000	32·13	33·44	30·64
Great Britain -	3,320,000	2,624,000	29·04	24·16	27·58

The results in the aggregate are, it is true, not so great as in 1894 or the still larger crops of 1889 and 1890, but the total exceeded the estimate of any other year.

The local estimates received from particular counties, which have yet to be examined in detail, appear to give the Western counties the largest rates of excess over the decennial average: Cornwall, Devon, Dorset, Somerset, and Wilts ranging from over 4 cwts. to 7 cwts. per acre above the normal clover hay crop, several Welsh counties giving similarly high returns, and one, Glamorgan, quoting a still higher excess in its yield per acre in 1897.

Of permanent grass the proportion of the acreage returned as reserved for hay in June last was somewhat less than in 1896, or indeed in any summer since 1893, but the average yield per acre was, as in the case of clover hay, well above the mean produce of the past ten years. The excess over 1896 was still more marked, the hay cut from 4,500,000 acres of permanent grass in Great Britain being estimated to have aggregated 5,636,000 tons, or more than one and a-half million tons over the preceding season's crop; the rate of yield per acre, as the following table shows, standing nearly 8 cwts. per acre in England over the yield of that year, and more than 2½ cwts., both in England and Wales, over the decennial average. In Scotland, the crop, though inferior both in the aggregate and

in the yield per acre to that of 1896, was even in that country slightly above the average rate of production.

Hay cut from Permanent Grass.	Estimated Total Produce.		Estimated Yield per Acre.		Average Yield per Acre, 1887-96.
	1897.	1896.	1897.	1896.	
	Tons.	*Tons.*	*Cwts.*	*Cwts.*	*Cwts.*
England - - -	4,963,000	3,487,000	25·44	17·58	22·90
Wales - - - -	479,000	325,000	20 20	12·99	17·48
Scotland - - -	194,000	248,000	28·84	29·23	28·31
Great Britain - -	5,636,000	4,060,000	24·99	17·51	22·53

Although a detailed examination of the county yields of hay must be deferred till the publication of the complete tables, it may be interesting to indicate that the crop of permanent grass was still more uniformly a good and over-average one in the English and Welsh counties than was the crop of clover hay, Yorkshire almost alone among the larger counties falling short of a ten years' standard. The Western counties generally, where the hay from permanent grass was so light in 1896, now estimate their yields at much more than double those of the preceding season.

IMPORTS OF AGRICULTURAL PRODUCE IN 1897.

The following statement, which has been compiled from the Trade and Navigation Returns, shows the quantities and values of the principal articles of agricultural produce imported into the United Kingdom during the past year compared with the similar imports for 1896. The total value of the receipts at British and Irish ports of the various products enumerated amounted in 1897 to £158,000,000; an increase of £6,000,000 over the sum represented by the corresponding consignments of the preceding year. The Trade Accounts of 1897 exhibit no interruption in the general tendency towards expansion in the volume of foreign and colonial food products directed to the ports of this country; but there was a decided contraction in the supplies of wheat and some other varieties of grain. This is a feature of some interest in connection with the improvement experienced in the price of cereals during the past twelve months, and will be referred to hereafter. At this stage it will be convenient to notice briefly the changes which have occurred in the quantities and values in the several groups of imports of the same class.

The supply of imported meats of all kinds, live and dead, excluding rabbits, amounted in 1897 to about 19,263,000 cwts., of the value of £38,205,000, whereas in the previous year the corresponding imports were approximately 17,607,000 cwts., valued at £34,789,000. Of fresh beef, on the hoof and in carcase, about 7,916,000 cwts. were received. This was an increase of nearly 717,000 cwts.

over the receipts of 1896; but salt beef remains a relatively unimportant item in our Trade Accounts.

ARTICLES.		1896.		1897.	
		Quantities.	Values.	Quantities.	Values.
			£		£
Horses	No.	40,677	1,027,736	49,519	1,254,342
Cattle	,,	562,553	9,305,055	618,336	10,461,236
Sheep	,,	769,592	1,133,634	611,504	919,096
Bacon	Cwts.	4,549,526	7,854,515	5,004,915	8,867,846
Beef:					
Salted	,,	247,536	303,700	175,236	216,241
Fresh	,,	2,659,700	5,028,828	3,010,387	5,783,667
Hams	,,	1,459,412	3,136,089	1,725,875	3,681,958
Meat unenumerated:					
Salted or fresh	,,	279,390	554,064	364,822	727,283
Preserved, otherwise than by salting	,,	701,750	1,775,507	669,785	1,701,306
Mutton, fresh	,,	2,895,158	4,718,546	3,193,276	4,827,868
Pork:					
Salted (not Hams)	,,	255,339	291,966	237,206	253,693
Fresh	,,	299,411	687,241	347,617	765,128
Rabbits	,,	170,873	401,614	276,458	543,494
Corn:					
Wheat	,,	70,025,980	21,678,989	62,743,280	23,363,505
Wheat Meal and flour	,,	21,320,200	9,227,873	18,680,669	9,599,656
Barley	,,	22,477,322	5,709,531	18,958,720	4,681,074
Oats	,,	17,586,730	4,226,317	16,116,810	4,038,813
Maize	,,	51,772,100	9,422,539	53,785,380	9,188,978
Butter	,,	3,037,718	15,344,364	3,217,801	15,916,911
Margarine	,,	925,934	2,498,425	936,543	2,485,370
Cheese	,,	2,244,525	4,900,342	2,603,608	5,886,546
Milk, condensed or preserved	,,	611,335	1,170,352	751,743	1,398,363
,, and cream, fresh		Galls. 22,776	5,489	cwts. 10,006	9,848
Eggs	Gt. hundreds	13,245,011	4,184,656	14,031,752	4,356,799
Fruit:					
Apples	Bushels	6,176,956	1,582,495	4,199,971	1,187,303
Pears	,,	483,823	206,674	1,051,694	377,808
Onions	Bushels	6,086,905	681,949	6,108,928	760,630
Potatoes	Cwts.	2,244,627	907,975	3,922,319	1,200,390
Hops	Cwts.	207,041	591,582	164,154	524,297
Tallow and Stearine	,,	2,049,749	2,178,652	1,950,975	1,870,289
Hides, wet and dry	Cwts.	973,797	2,224,941	1,195,245	2,750,154
Lard	,,	1,739,463	2,268,693	1,740,468	1,993,143
Poultry and Game		—	705,478	—	730,725
Vegetables (unenumerated)		—	1,284,753	—	1,454,720
Hay	Tons	107,963	355,344	121,492	—
Wool	Lbs.	713,575,173	24,958,346	735,632,516	24,436,872

For imported fresh mutton the demand also rose above the level of 1896, since the live and dead consignments during the past year, which, in the aggregate, represented about 3,541,028 cwts. of mutton, were 206,000 cwts. in excess of those of the former period. Foreign and colonial bacon and hams continue to find an increasing market in this country, the weight of these articles entered in 1897 having been 6,731,000 cwts., this supply being 722,000 cwts. more than the previous year's entry, and the largest annual importation recorded. About 585,000 cwts. of pork, fresh and salted, were received, and meat unenumerated, salted, fresh, and

preserved, figures in the accounts to the extent of 1,034,000 cwts., as compared with 981,000 cwts. in 1896.

The United States continues to be our principal purveyor of beef, the consignments from that country, which included 416,299 live cattle and 2,242,000 cwts. of fresh beef, having constituted nearly 71 per cent. of our imports of this class of meat in the past year. Among other countries engaged in this trade, Canada contributed 126,495 head of cattle, and Argentina sent 73,867 head. The last-named country again held, as she did in 1896, the premier position as an exporter of live sheep and lambs to the United Kingdom, the number of Argentine sheep landed having been 345,217, out of a total importation of 611,504 head, the remainder being made up of 63,761 head from Canada; 186,755 from the United States; and 12,797 from Iceland. Argentina also furnished 908,623 cwts. of refrigerated mutton; but the bulk of the supply of this article was as usual of colonial origin, the Australasian cargoes having formed almost exactly two-thirds of the entire receipts, which were 3,193,276 cwts. The entry of 6,731,000 cwts. of bacon and hams included 5,196,000 cwts. from the United States, 1,026,000 cwts. from Denmark, and 409,000 from Canada.

The total value of the imports of corn, including wheat-meal and flour, amounted in 1897 to £50,872,000, or £606,777 more than in 1896. A noteworthy feature of the import trade in cereals of the past year was, as has been already stated above, a considerable diminution in the consignments of foreign wheat, of which the total importation, including flour converted into its equivalent weight of grain, amounted to 88,688,653 cwts. This supply is smaller than that of any year since 1890, when 82,381,591 cwts. were imported. The quantities discharged annually at our ports in recent years have been as follows:—

Year.	Cwts.	Year.	Cwts.
1890 ...	82,381,591	1894 ...	96,702,072
1891 ...	89,539,355	1895 ...	107,261,636
1892 ...	95,604,589	1896 ...	99,637,369
1893 ...	93,806,666	1897 ...	88,688,653

Thus, between 1895 and 1897, the pressure of the competi-

tion of foreign and colonial wheat was relaxed to the extent of nearly 20,000,000 cwts., and it should be noted that concurrently with this retrograde movement in the imports, there has been an upward tendency in the prices recorded for wheat in our markets. The contraction of the supply was due largely to considerable diminutions in the cargoes from Argentina, British East Indies, and Australasia, countries where the harvest had been bad. From the first-named country only 933,100 cwts. were received, as compared with 11,400,000 cwts. in 1895; while the Australasian contribution, which amounted to 3,486,620 cwts. in the earlier year, and dropped to 6,500 cwts. in 1896, disappeared altogether last year. India, too, under circumstances which are well known, sent us only 572,760 cwts. in 1897, or nearly 8,300,000 cwts. short of the quantity credited to her in 1895. Russia with a delivery of 15,000,000 cwts. was also 8,000,000 cwts. below the level she reached two years previously. From the United States, on the other hand, we received 7,500,000 cwts. more than two years previously, besides an additional supply of wheat flour, amounting to nearly another million cwts.

Russia considerably reduced her shipments of barley to the United Kingdom during the past year, when she was credited in the Trade Accounts with only 7,494,000 cwts., as compared with 13,281,157 cwts. in 1895, and 9,245,400 cwts. in 1896. In the past three years our imports of barley have fallen off to the extent of nearly 5,000,000 cwts., and as this decline has been confined to the cheap Russian variety, it is not, perhaps, unconnected with the remarkable impetus given to the use of maize as a feeding stuff by the abundant supplies of this grain placed on our markets by America since 1895. In the course of the past twelve months, the aggregate receipts of Indian corn or maize amounted to 53,785,000 cwts. as compared with 51,772,000 cwts. in 1896, and only 33,944,000 cwts. in the previous year. Nearly 75 per cent. of the supply of this product in 1897 was shipped from the United States, and its average declared value was 3*s.* 5*d.* per cwt., or about 1*s.* 10*d.* per bushel.

Of dairy produce, including margarine and fresh or condensed milk, the importation during the past year represented a total disbursement, according to the declared values, of

£25,697,000, or £1,778,000 in excess of the sum at which the corresponding imports of 1896 were valued. Over half the amount is accounted for by the supplies of foreign and colonial butter, of which we received 3,217,801 cwts., declared to be worth £15,917,000. Denmark maintained her position as our principal purveyor of this article with a delivery of 1,334,726 cwts. in the twelve months; France followed with 448,128 cwts.; Sweden furnished 299,214 cwts.; Holland, 278,631 cwts.; and Russia, about 200,000 cwts. Other European countries competing in this trade in the past year were Norway, Belgium, and Italy. The consignments of Australasian butter amounted to nearly 270,875 cwts., of which Victoria sent 169,000 cwts., New Zealand 76,522 cwts., and New South Wales 23,835 cwts., while the remainder was made up of small consignments from South Australia and Queensland. The trans-Atlantic contributions included 109,000 cwts. from Canada, 154,000 cwts. from the United States, and 12,000 cwts. from Argentina. Canada furnished, as has been the case since 1890, the largest proportion of our imports of cheese, the quantity received from the Dominion in 1897 having been 1,526,664 cwts. The United States provided us with 631,616 cwts. of this product, and Holland was responsible for 297,559 cwts. To the latter country we were also indebted for 872,595 cwts. of margarine, out of a total importation of 936,543 cwts. The supplies of this article have remained practically stationary for the past three years. The imports of fresh milk and cream, which had formerly been recorded in gallons, were last year entered in weight. The total declared value of the 10,000 cwts. received was £9,848, and although this exceeds the sum at which the previous year's imports were valued by £4,400, it is less than half the amounts debited to this country in the Trade Accounts for imported fresh milk and cream in 1894 and 1895, which were £21,371 and £19,991 respectively. The consignments received in 1897 included supplies from Sweden to the value of £4,187; from the United States, £2,437; and from France, £2,189. The importation of milk from France was confined to the last three months of the year.

Our imports of dead rabbits have rapidly increased within the past few years; the quantity received in 1897 was 276,458 cwts., of the value of £543,494. Until 1896, when we imported 170,873 cwts., our annual receipts of this article had only once exceeded 140,000 cwts. An interesting feature in the import trade in poultry and game, is the prominent position now occupied by Russia. In 1897 she was credited with consignments to the value of £186,800, thereby ranking second to France, whence we received supplies valued at £256,113. The annual imports of eggs have increased almost uninterruptedly for the past twenty years, and since 1895 they have exceeded £4,000,000 in value yearly. In 1897, Russia figured, in point of quantity, for the first time as the principal competitor in this trade, with a delivery of 375,879,960, out of a total importation of 1,683,810,240; Germany contributed 356,622,000; France, 321,080,000; Belgium, 295,702,000; and Denmark, 209,856,000.

The quantity of potatoes imported last year, 3,922,319 cwts., was the largest annual importation recorded of this vegetable during the past decade, the increase coming chiefly from Germany; but otherwise the entries of vegetables and fruit for 1897 do not present any features calling for special notice.

THE FERTILISERS AND FEEDING STUFFS ACT.

Reports received by the Board of Agriculture show that samples were analysed under the Fertilisers and Feeding Stuffs Act, 1893, in 56 counties or county boroughs during the year 1897, the total number of analyses having been 836, of which 586 were samples of fertilisers and 250 of feeding stuffs.

The reports again exhibit an increase in the number of samples analysed over the number in the preceding year, although the excess, amounting to 34 fertilisers and 5 feeding stuffs, is not so large as that recorded in 1896. It is, however, only in England and Wales that progress in this direction can be noticed, as Scotland shows a decline.

The comparison between 1897, 1896 and 1895 for the whole country stands as follows :—

——	Number of Counties Reporting Analyses.			Total Number of Samples Analysed.		
	1897.	1896.	1895.	1897.	1896.	1895.
England, counties - -	29	26	27	391	362	235
,, boroughs -	1	3	1	61	35	35
Wales, counties - -	7	5	5	41	22	23
Scotland, counties- -	18	20	21	341	378	322
,, boroughs -	1	—	—	2	—	—
GREAT BRITAIN -	56	54	54	836	797	615

The number of analyses made in each of the four quarters of 1897 may be shown as under :—

——	Fertilisers.				Feeding Stuffs.			
	Quarter.				Quarter.			
	1st.	2nd.	3rd.	4th.	1st.	2nd.	3rd.	4th
England, counties -	67	122	15	44	47	20	34	42
,, boroughs -	6	8	2	7	11	5	6	16
Wales, counties - -	15	10	—	12	1	1	—	2
Scotland, counties -	47	195	22	14	14	18	10	21
,, boroughs -	—	—	—	—	2	—	—	—
GREAT BRITAIN -	135	335	39	77	75	44	50	81

The following summary shows the number of samples analysed in those counties from which analyses were reported in 1897 and 1896:—

COUNTIES.	1897. Number of Samples analysed.			1896. Number of Samples analysed.		
	Fertilisers.	Feeding Stuffs.	Total.	Fertilisers.	Feeding Stuffs.	Total.
ENGLAND:	No.	No.	No.	No.	No.	No.
Chester	7	4	11	3	—	3
Cornwall	—	—	—	1	—	1
Cumberland	1	—	1	—	—	—
Devon	11	4	15	7	6	13
Dorset	12	20	32	2	30	32
Durham	13	2	15	10	3	13
Essex	20	1	21	16	4	20
Gloucester	1	2	3	2	2	4
Hants	—	1	1	—	—	—
Hereford	6	—	6	4	—	4
Hertford	—	2	2	—	—	—
Kent	6	—	6	1	1	2
Lancaster	—	—	—	2	—	2
Leicester	1	1	2	2	1	3
Lincoln, parts of Holland	—	—	—	9	—	9
,, ,, Kesteven	2	—	2	—	6	6
Monmouth	39	42	81	37	34	71
Norfolk	—	—	—	1	—	1
Northumberland	2	—	2	—	—	—
Oxford	—	2	2	—	8	8
Salop	27	21	48	20	25	45
Somerset	28	—	28	27	1	28
Stafford	6	2	8	7	5	12
Suffolk, Eastern Division	1	—	1	1	—	1
,, Western ,,	—	—	—	1	—	1
Surrey	4	—	4	3	—	3
Sussex, Eastern Division	3	1	4	—	—	—
Warwick	—	1	1	—	—	—
Westmorland	37	19	56	35	18	53
Wilts	3	11	14	—	—	—
Worcester	9	5	14	10	—	10
York, East Riding	5	1	6	8	5	13
,, North Riding	—	1	1	—	—	—
,, West Riding	4	—	4	1	3	4
COUNTY BOROUGHS:						
Croydon	—	—	—	1	—	1
Newport, Mon.	23	38	61	13	20	33
Wolverhampton	—	—	—	—	1	1
TOTAL ENGLAND	271	181	452	224	173	397

COUNTIES.	1897. Number of Samples Analysed.			1896. Number of Samples Analysed.		
	Fertilisers.	Feeding Stuffs.	Total.	Fertilisers.	Feeding Stuffs.	Total.
WALES :	No.	No.	No.	No.	No.	No.
Cardigan	8	—	8	5	—	5
Carmarthen	4	—	4	2	—	2
Denbigh	1	—	1	1	—	1
Flint	2	—	2	—	—	—
Glamorgan	1	—	1	—	—	—
Montgomery	18	3	21	8	3	11
Pembroke	3	1	4	3	—	3
TOTAL WALES	37	4	41	19	3	22
SCOTLAND :						
Aberdeen	35	5	40	57	3	60
Argyll	—	3	3	7	2	9
Ayr	29	1	30	44	—	44
Banff	2	—	2	6	1	7
Berwick	5	—	5	6	3	9
Bute	—	—	—	7	1	8
Dumfries	10	—	10	14	—	14
Fife	—	2	2	3	—	3
Forfar	1	2	3	1	13	14
Kincardine	11	1	12	6	2	8
Kirkcudbright	19	—	19	13	6	19
Lanark	13	—	13	14	—	14
Linlithgow	23	3	26	10	1	11
Midlothian	21	10	31	16	7	23
Peebles	—	—	—	1	—	1
Perth	79	22	101	72	20	92
Renfrew	—	3	3	4	3	7
Ross and Cromarty	23	8	31	11	4	15
Selkirk	1	3	4	—	—	—
Stirling	—	—	—	2	1	3
Wigtown	6	—	6	15	2	17
COUNTY BOROUGH :						
Greenock	—	2	2	—	—	—
TOTAL SCOTLAND	278	65	343	309	69	378
TOTAL GREAT BRITAIN	586	250	836	552	245	797

WATER WAGTAILS, OR "DISHWASHERS."

(*Motacillæ.*)

There are five species of Wagtails found in this country. Of these only three are fairly common—the Pied Wagtail (*Motacilla lugubris*), the Grey Wagtail (*Motacilla melanope*), and the Yellow Wagtail (*Motacilla Raii*). The other two, the White Wagtail (*Motacilla alba*) and the Blue-headed Wagtail (*Motacilla flava*), are comparatively rare in Great Britain. Few other species of birds are so beneficial to agriculture as the Wagtails, because their food is for the most part of a "soft" character, comprising insects of all kinds and in all stages. For this reason alone, leaving aside their harmlessness to crops and their beauty, they deserve to be protected.

These graceful birds do not figure in the original schedules of the Wild Birds' Protection Act of 1880; but in several counties in England, Wales, and Scotland some of the species have been added to the schedule, and all kinds of Wagtails are protected throughout the year in the counties of London, Middlesex, and Essex. In only a few counties in England are the eggs protected by the Act of 1894.

The Pied Wagtail is perhaps the most common of the Wagtails, and may generally be seen in meadows, pastures and fields where cattle and sheep are grazing, in order to get the insects attracted by these animals. Gilbert White says: "Wagtails run round cattle, availing themselves of the flies that settle on their legs, and probably finding worms and larvæ roused by the trampling of their feet." "Interest," he adds, "makes strange friendships." This bird is also seen near ponds, streams and rivers, and in marshes and flooded meadows, taking the insects found there. If Pied Wagtails are watched, it will be seen that they are never still, but are



THE PIED WAGTAIL (*Motacilla lugubris*).


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continually hunting for insects of all descriptions: beetles, flies, moths, and aphides, as well as millipedes, snails and slugs.

The Pied Wagtails migrate from the more northern to the southern parts of the kingdom in the autumn, and some leave this country for the winter. Flocks of them have been noticed in Kent and Sussex near the coast in September, evidently bound for foreign climes. These return again very early in the spring, but there are always Pied Wagtails to be seen throughout the winter in this country, except in the more northern regions.

The male of this species of Wagtail is rather more than 7 inches in length, the female is slightly over 6 inches long, from beak to tip of tail. The body is black above, while the breast, belly, and parts under the tail are white. There are also white feathers on the margins of the wings and tail, but the legs and beak are black. The throat is black in summer, but becomes white in winter. Breeding begins in the spring, and there are often two broods in the season. The nest is constructed of moss, dried grass, bents, and fine roots, and lined with wool, feathers, and other soft materials. From four to six eggs are laid, of which the ground colour is bluish white, with brownish or purple-brown specks.

The Grey Wagtail (*Motacilla melanope*) is not such an abundant species as the Pied Wagtail. It is of more solitary habits, and is found chiefly in the mountainous and hilly districts of England and Scotland. It breeds, however, frequently in Devon, Dorset, Somerset, and Wilts, and in localities generally where there are streams and brooks, and plenty of water; but less frequently in the south-eastern districts. It is fairly common in Ireland. It migrates to the more southern counties in the autumn. Like the Wagtail first described, this species subsists entirely upon insects, and may be seen, especially near brooks and other watercourses and in marshes, busily hunting for its food. It is particularly addicted to small snails—fresh-water molluscs—and this predilection enables it to do good service to sheep farmers and breeders by destroying quantities of the snail known as *Limnæa truncatula*, which is the host of that scourge of

flocks the liver-fluke (*Distoma hepaticum*). Species of *Limnæa* have been found in the crops of all the three Wagtails commonly met with. It was not actually ascertained that the snails were *Limnæa truncatula*, but there can be no doubt that if these birds feed upon one species of *Limnæa*, they would also feed upon *Limnæa truncatula*, a small thin-shelled snail coming from watercourses and wet ditches to marsh pastures and low-lying grass-land. It is stated upon good authority that another and smaller species of *Limnæa*, known as *Limnæa pereger*, of similar habit as *L. truncatula*, is also a host of the liver-fluke. Where there are no snails of these particular species there can be no liver-fluke or rot in sheep, and if there are plenty of Water Wagtails snails will not long exist.

The Grey Wagtail is not quite so large as the Pied Wagtail. In colour it is blue-grey or slate, with a line of white and a white patch above the eyes. It has a black chin and throat; the breast, belly, and under side of the tail are yellow; the beak and feet are black; and the wings dark, tipped with light olive. It builds early in the spring, generally in banks, a nest lined with hair, much like that of the Pied Wagtail, and lays five eggs as a rule, though sometimes as many as seven have been seen. The eggs are of a creamy white colour, speckled with light brown blotches.

The Yellow Wagtail (*Motacilla Raii*) is not a winter resident in this country, but appears in March, and leaves in September and October. It is generally distributed throughout England, but is not common in Scotland, except in the more southern counties, whilst in Ireland it is rarely seen. On the first arrival of the immigrants they are found in marshes and grass land, but soon pair and go to the cultivated fields, where they may be seen hunting for insects and following the plough with assiduity, swallowing millipedes, wireworms, and other insects as they are turned up. Breeding begins early, and after the young are hatched, the birds move off to meadows, marshes, and pastures, where they follow cattle and sheep for the insects around them, and may be seen busily hunting for all kinds of insects, upon

which they live. Like all the Wagtails or Dishwashers, they like water, and they are constantly found near water-courses, ponds, and marshy places. There is no doubt that this Wagtail, like its congeners, devours the snail-hosts of the liver fluke.

The Yellow Wagtail, as its name implies, is mainly of a yellow or canary colour. The upper parts of the bird are olive, or greenish yellow, and the lower parts more of a canary yellow. The plumage of the female is not so bright as that of the male; the bill and feet are black. In length it is about $6\frac{1}{2}$ inches. From four to six eggs, varying in colour from pinkish brown to a darker brown, are laid. The nest, usually on the ground in grass or tufts, and occasionally on a bank, is composed of dried bents and fine roots, with dried grass and wool, or hair, or even fine roots, for a lining. Nests have been found upon ploughed land. Two broods are sometimes produced in a season.

THE SIZE AND TENURE OF FARMS IN FRANCE.

The publication about a year ago of the results of the 1895 enquiry into the number, extent, and distribution of the agricultural holdings of Great Britain lends a special interest to the tables still more lately issued by the French Ministry of Agriculture, giving the conclusions of the special enquiry, undertaken in 1892 in that country, into the rural economy and conditions of farming tenure in France. Explanatory official reports on the statistics, with comparative summaries of the very exhaustive investigations made, are not yet forthcoming; but the figures themselves, as issued, enable a general impression to be formed as to the size of the farms into which the agricultural area of France is divided, and the extent to which they are cultivated by their owners. The date of these returns is ten years later than that for which similar French statistics have been previously available.

The entire area brought under review covers 124,656,000 acres, a surface which, it is to be remembered, includes 23,500,000 acres of woods and forests, and nearly 15,400,000 acres of uncultivated but partially grazed wastes, probably not dissimilar in character to the rough grasses of the mountain and heath land of our own agricultural returns. Leaving out the woods and uncultivated land, the territory under cultivation is more than two and a-half times the apparently similar area of Great Britain. It is divided into more than ten times as many farms, for an area of some 85,759,000 acres is accounted for as farmed in 5,618,000 separate holdings. These holdings apparently average in extent just one-fourth of our own, or a little over 15 against 63 acres

here. In the new returns the French holdings are analysed in three groups: as farms cultivated by the owner, either alone or with the aid of his family or others; as farms occupied under a system of *métayage;* and, lastly, as tenanted farms.

Of the whole number, the owner-farmed holdings are much in the majority in France, three out of every four belonging to this category, but these owner-farmed estates are much smaller in extent than the tenanted farms. The figures as given under this classification, with a further analysis of the land farmed as arable, pasture, vineyard, and garden, respectively, may be grouped as follows :—

Number and Area.	Farmed by Owners.	Farmed on Métayage.	Farmed by Tenants.	Total.
	No.	*No.*	*No.*	*No.*
NUMBER - - -	4,190,795	349,338	1,078,184	5,618,317
AREA :—	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Arable land - -	31,607,800	7,294,400	25,034,400	63,936,600
Pasture ,, - -	9,116,000	1,570,400	5,509,300	16,195,700
Vineyards - -	3,723,500	368,000	355,700	4,447,200
Gardens - - -	813,900	71,600	293,700	1,179,200
Total Area - -	45,261,200	9,304,400	31,193,100	85,758,700
Average Area - -	10·8	26·63	28·93	15·26

These statistics very clearly indicate what we must accept as a leading feature of French land tenure, and it is significant to observe, that half of the arable land of the country, a little more than half of the pasture, as much as six-sevenths of the vineyards, and more than two-thirds of the garden land are cultivated by their proprietors.

It is further to be noted that the owner-farmed holdings reach 75 per cent. of the total, and the tenanted 19 per cent., while those held on the system of *métayage* (including what are known as "colonies") but 6 per cent. We have no precisely similar classification here to place beside these calculations; but assuming that the area of 32,578,000 acres accounted for in the British enquiry of 1895

related to the same class of cultivated land represented by the 85,759,000 acres dealt with above—an hypothesis which may be accepted as nearly, though probably not quite, exact until fuller definitions are forthcoming, the position here is the reverse of that obtaining in France, for only 11.7 per cent. of the 520,000 agricultural holdings returned in Great Britain are shown as owner-farmed, against 75 per cent. in France, while 84·5 per cent. of the farms accounted for here are cultivated by tenant-farmers—besides the 3·8 per cent. of the British cases where the farms shown in our returns were as to part of their area tenanted, and as to part owned. As, however, the 4,191,000 owner-farmed holdings in France show an average acreage of no more than 10·8 acres, while an average French holding of all types is over 15·2 acres in extent, the bulk of the proprietor-farms in France is to be found in the category of small farms. It is probably very nearly true to say, that whereas 4,640,000 acres, or just one-seventh of the cultivated area of Great Britain, was returned as farmed in 1895 by its owners—that is by some 80,000 persons, including in that total those who own part only of their farms—almost ten times that surface, or 45,261,000 acres, is in France cultivated in the 4,191,000 owner-farmed holdings.

There is, it must be confessed, some uncertainty as to the smallest unit of area considered as an agricultural holding in the French returns, while our own are now definite in refusing that designation to anything that does not exceed an acre. But if the two sets of figures may legitimately be treated as parallel, the average holding of the whole number of British owners who are wholly or in part cultivating their own soil comes out at 58 acres, or very little less than the average holdings of this country. This compares with under 11 acres in a typical French proprietor-farmed holding—an area less by a third in extent than the average French holding. Such a calculation, if permissible, roughly indicates the essential differences of the two rural systems; for it has already been noted that an average French farm is just one-fourth the size of an average English holding, whereas, it seems that a French owner-

farmed estate is not much over a sixth of the size of one so held in Great Britain. It may be remembered that although the British returns showed more than an average number of owner-farmed holdings under 5 acres, the greatest percentage of farms in the landlords' occupation occurred in the holdings of the largest area, such as those exceeding 500 acres.

In a further set of tables, which deal not with the position as to ownership, but simply with the relative size of French holdings, a larger acreage is dealt with, for both the woods and uncultivated grazings are there included. This brings up the total of the agricultural territory of France to 124,600,000 acres, whereof almost exactly 3,000,000 acres is owned by the State—the national forest area alone slightly exceeding 2,690,000 acres. This area is excluded from the classification of agricultural holdings by size, bringing the total so analysed down to a little under 122,000,000 acres, a figure which still includes the woods and forests belonging to the communes, which cover an area more than twice as large as the State forests. It includes also the 15,300,000 acres of the woodlands in private hands, and the 15,400,000 acres of rough uncultivated land, all of which have a place in the table in which the relative dimensions of the holdings are exhibited. These features must be borne in mind, as they make the area dealt with less comparable to the so-called cultivated area here, than that which formed the basis of the preceding comparison of French holdings according to ownership or tenancy.

The enlarged basis is thus probably accountable for the extended number of holdings, which are returned for this purpose as 5,703,000, in place of the 5,618,000 already given These holdings are classified in eleven groups, the smallest including all holdings below a single hectare (or $2\frac{1}{2}$ acres), and the highest class embracing all holdings of more than 300 hectares (or 741 acres). The several groups or classes, as well as the areas dealt with, do not lend themselves easily to comparison with our returns, but in a condensed form the results are sufficiently interesting to be given, as under, in the accompanying table, which shows the number and extent of

agricultural holdings in France in 1892 in five leading groups :—

Classes of Holding.	Number of Holdings.	Total Area of these Holdings (including Woods and Forests and Uncultivated Land).	Of which the Area Cultivated is
		Acres.	*Acres.*
Under 1 hectare (2½ acres) - - -	2,235,405	3,278,500	2,824,000
1 to 5 hectares (2½ to 12½ acres) - -	1,829,259	13,558,300	11,424,900
5 to 10 hectares (12½ to 25 acres) - -	788,299	14,216,100	11,731,500
10 to 40 hectares (25 to 100 acres) -	711,118	35,354,100	28,032,500
40 hectares and over (100 acres and over)	138,671	55,558,700	31,745,800
Totals, 1892 - - - - -	5,702,752	121,965,700	85,758,700

The columns of this table indicate once again the numerical predominance of the small properties of France. More than 39 per cent. of the whole number are of less than 2½ acres in extent, whereas in Great Britain, where the smallest group enumerated ran from 1 to 5 acres, the proportion so classed was but 23 per cent. of the total. French holdings of under 25 acres account for 85 per cent. of the whole : British holdings not exceeding 20 acres reached 51 per cent. only. So, too, at the other end of the scale, the French holdings of 100 acres and over only form 2½ per cent. of the whole, while the British holdings exceeding 100 acres made up more than 19 per cent. of those enumerated in 1895. Of course, as with ourselves, the greater part of the surface is farmed in the larger holdings ; but not quite 75 per cent. of the total area of France was found in holdings over 25 acres, while 94 per cent. of the surface accounted for in 1895 in Great Britain was held in farms exceeding our 20 acre limit. In France there are 139,000 farms whose total area, including woods and waste, was 100 acres or more. These larger farms contained 37 per cent. of the cultivated surface of France ; whereas in Great Britain the 100,000 farms which exceeded 100 acres absorbed no less than 70 per cent. of the cultivated land of the country.

The new French Returns afford us also means of learning

what is the working force of agriculturists engaged in farming operations in any capacity on the holdings to which reference has just been made. The total, it would seem, amounted to 6,647,044. Of these, 2,199,220 were exclusively proprietors, farming their own lands themselves, or by means of a bailiff. Another 1,188,025 persons cultivated their own land, but worked also at the same time on the land of others in the quality of tenants, *métayers*, or day-labourers. The total number of farming proprietors was, accordingly, 3,387,245, of whom nearly two-thirds were owners pure and simple.

The tenantry of France may be classified as tenant proper —1,061,401, of whom 475,778 also owned some land—and *métayers*—344,168, of whom 123,297 also cultivated a holding of their own. Outside of these categories, to make up the total of agricultural workers there were brought into account 1,210,081 day labourers, of whom nearly half, or 588,950, were, in a more or less minute fashion, apparently landowners as well as hired workers, while these again were supplemented by the regular staff of farm servants of various grades employed by the cultivators of land in France, which numbered 1,832,174 persons of both sexes.

It will be noticed that the figures now quoted as to the number of individual farmers of the owning class are very considerably fewer than the number of separate owner-farmed holdings, distinguished in the preceding pages, and assuming the classification just made to have been an exhaustive one, a large proportion of the farmer-owners would appear to farm more than one of the units of cultivation distinguished as a "holding." The number of cases where more than one holding was farmed by tenants or *métayers* was, on the other hand, comparatively small.

HORSE-BREEDING IN AUSTRIA-HUNGARY.

The Appendix to the Minutes of Evidence taken before the Royal Commission on Horse-Breeding in Ireland [C.—8652] contains a report by Mr. M. de C. Findlay, of Her Majesty's Embassy at Vienna, on the methods adopted for the improvement of horse-breeding in Austria and Hungary.

The Austrian Government first began to take an active interest in horse-breeding in the reign of the Emperor Charles VI. By a decree of 1736, the provincial authorities were directed to provide stallions suitable for getting remounts, and the working of very young horses was forbidden. But the first great impulse to horse-breeding was given by a decree of Maria Theresa in 1763, and since then the State has continued to encourage the practice as far as possible. The existing studs at Radautz and Piber were established in 1792 and 1798 respectively. The first to systematise horse-breeding on scientific principles in Austria was Count Hartegg, who became manager in 1815. He imported at various times a number of thoroughbreds, both Arab and English, established premiums for stallions and mares, and aimed especially at supplying all remounts for the army from the country itself. He was a great believer in Arab blood, but after his death in 1854 his successors began to use English thoroughbred blood more and more. In 1869 the care of the State studs and horse-breeding establishments was transferred from the Ministry of War to that of Agriculture.

The Austrian Ministry of Agriculture included in its estimates for 1897 a sum of £170,300 for the encouragement of horse-breeding. Of this the chief expenditure was for the maintenance of State studs (£33,300), and stallion depôts (£92,000). A provision of over £25,000 was also devoted to additions to State breeding-stock by purchase

from private breeders. As regards receipts, it was estimated that these would amount in 1897 to about £28,000, chiefly from covering fees. These receipts are paid by the Ministry of Agriculture into the Ministry of Finance.

There are in Austria two State studs, at Radautz and Piber, their object being to provide stallions for use throughout the country. These stallions are first sent to the central depôts, and thence distributed to the various covering stations, where they remain during the season. Care is taken that each stallion should be suited to the requirements of the district where its services are to be placed at the disposal of farmers and private breeders. For the use of the country stallions a fee of from one to ten guldens (1s. 8d. to 16s. 8d.) is usually charged per mare; but in some districts, where the peasants are very poor, and the breed of horses is in danger of degenerating, mares may be covered by State stallions free of charge.

A committee of inquiry, sitting in 1876, divided the whole Cis-Leithan territory into five districts, with a view to the distribution of stallions especially suited to existing local breeds. As far as possible, the local breeds were to be kept pure, but the character of the country rendered it in some cases desirable to utilise other special breeds.

The management of the State studs, stallion depôts, and covering stations is entrusted to a Military Department—which is an integral part of the standing army. This department is subordinated to the Ministry of War in matters purely military; to the Ministry of Agriculture as regards everything connected with the horse-breeding establishments; and to the commander of the local military division in matters of discipline. Only the purely agricultural part of the stud farms is worked by civilians—a civil organisation having been tried and failed, owing to constant changes amongst the employés, who were attracted by higher wages elsewhere.

As it is found that the State studs at Radautz and Piber cannot supply all the stallions required, entire colts, usually yearlings, are purchased by the State and reared at farms kept especially for this purpose. The State breeding-stock is

also augmented by purchase from private breeders, either in the country or abroad. There are also foal farms in Nadworna, where fillies purchased by the State are reared for eventual distribution to the peasants in the poorer parts of Galicia (free of charge) on condition that they should be used for breeding purposes.

In addition to the above organisation for the supply of stallions at a very low fee, the estimates included an item of £12,300 for prizes at race-meetings, at horse-shows, and to breeders; for subventions to owners of licensed stallions, and to private owners for rearing foals with a view to breeding. Every recipient of a State prize has to keep the animal in question for another year.

Among other encouragements may be mentioned the sale of mares at a price far below their actual value, in the poorer districts, on condition that they are used for breeding. It is possible also to obtain State stallions on hire for use in a private stud under very favourable conditions. A further advantage is the ready market offered to private owners by the frequent purchase by Government of animals suitable for the State studs, and for cavalry and artillery remounts.

The number of stallions owned by the State, when the report was written, was 2,138, of which 1,763 were in 522 covering stations, 276 in private hands, and 99 on hire. As regards the breeds, 94 were English thoroughbreds, 766 English half-breds, 208 Norfolk, 339 Arab half-breds, and 515 cart-horses, the remainder being made up of Arab thoroughbreds, Lippizaner, Kladruber, and Normans. Most of these animals are bred in the country.

Private owners are encouraged to keep stallions to cover their mares and also those of others, as by this means it is hoped that horse-breeding may be gradually emancipated from State assistance. All stallions used for covering mares, other than those belonging to the proprietor of the stallion, must have a license (gratis), even if no covering fee be charged. This license is only granted after a veterinary examination, the cost of which is borne by the State; and the use of an unlicensed stallion (except for the owner's own mares) is a punishable offence. In some provinces the

proprietor is obliged to issue a certificate to the owners of mares covered by his stallion, and to keep an accurate register of such mares; in some instances, also, the licensed stallion must be examined once a month by a veterinary surgeon. Licensed stallions, particularly cart-horses, are sometimes granted a State subvention when recognised as specially suitable for stud purposes in a given locality. The fee charged by private owners is always a matter of arrangement between the parties interested.

Besides the State studs, there are Imperial studs at Kladrub and Lippiza, which have been successful in producing two fine types of carriage-horse.

Mr. Findlay concludes his account of the Austrian system by remarking that the percentage of foals in the State studs varies between 60 and 70 per cent., whereas in a stud the increase should be about 80 per cent. This may, however, be due to the climate, and the increase among farmers' stock is much smaller. He adds that there is no doubt that the State studs have done much in raising the quality of the horses bred throughout the country, in preserving good local breeds, and in spreading a knowledge of breeding upon scientific principles among the farmers.

In Hungary it appears that the system of State encouragement and of management of State studs is similar to that followed in Austria; in Hungary, however, thoroughbred stock is raised in the State studs. Of these there are four: Kisber, Babolna, Mezöhegyes, and Fogoras. The estimate of the Hungarian Ministry of Agriculture for horse-breeding in 1897 amounted to some £230,000, £96,000 being allocated to the State studs, and £122,500 to the stallion depôts. The receipts were expected to reach nearly £100,000. These figures are exclusive of the stud farms. There are eighteen stallion depôts, and 946 covering stations in different parts of the country; and the number of stallions kept in 1896 at the depôts was 2,838.

Committees are formed in different parts of Hungary with the view of making the farmers acquainted with the object and principles of rational breeding, thus constituting a connecting link between the Government breeding establishments and

the private farmers. The Government constantly purchases stallions for the State studs from private breeders, and the military authorities also endeavour to procure the necessary supply of horses direct from them. Stallions thus bought by the Government are sometimes resold at low prices to communities on easy terms. Facilities are granted to farmers for the transport of breeding stock by the Hungarian State railways.

Regular stud-books are kept at the State studs, and the Hungarian Agricultural Society has also introduced stud-books to be kept at their offices for the registration of the stallions and mares of private breeders, but such registration is not compulsory.

THE TRADE OF AUSTRALASIA IN AGRICULTURAL PRODUCE.

The exports of agricultural produce from Australasia in recent years have amounted in value to about £26,000,000 annually, all but about a fifth of this sum representing consignments of Colonial produce to the United Kingdom. New South Wales claims the lion's share of this trade, with shipments returning an estimated gross yearly income of over £8,000,000. For the second place there is close competition between Victoria and New Zealand, the respective export trade accounts of these colonies amounting to between £5,000,000 and £6,000,000 per annum. Queensland follows with an annual extra-colonial exportation of the approximate value of £3,000,000; and South Australia participates to the extent of about £2,000,000. In Western Australia agriculture has not yet emerged from the pioneer stage, consequently the exports of the products of the industry from this colony are inconsiderable. Tasmania may be regarded as the market garden for the continent of Australia, and the bulk of her produce is consigned to consumers on the mainland; her extra-colonial exports amount in value to between £150,000 and £250,000 yearly.

Wool continues to be the chief product of farming in Australasia, and constitutes the principal item in the accounts of the outward trade of the country. The dominant position occupied by this staple relatively to other kinds of produce exported is shown by the following statement of

the values of the principal agricultural exports, excluding wine, in each of the three years 1893-1895 :—

PRODUCTS.	1893.	1894.	1895.
	£	£	£
Wool - - - -	18,394,000	18,409,000	17,282,000
Meat - - - -	1,975,000	2,469,000	3,015,000
Wheat, grain and flour -	1,843,000	1,591,000	909,000
Tallow - - -	1,258,000	1,541,000	1,520,000
Skins and hides - -	1,173,000	855,000	1,168,000
Butter - - - -	898,000	1,280,000	1,139,000
Other products - -	399,000	425,000	525,000
Total -	25,940,000	26,570,000	25,558,000

From the foregoing figures, in which the exports from Western Australia are not included, it will be observed that the value of the shipments of wool is roughly equivalent to two-thirds of the sum at which the exports of all kinds of agricultural produce are valued.

The production of wool for exportation is an important branch of pastoral farming in nearly all the colonies, but New South Wales has the largest interest in this industry, her flocks numbering about 48 million head out of the 112 million sheep enumerated in Australasia in 1896. The average shipments of greasy and scoured fleeces from this colony, including the consignments from Victorian ports, are valued at between £8,000,000 and £9,000,000 yearly.* Merinos are the prevailing breed of sheep existing in New South Wales, 90 per cent. of the flocks being made up of this variety, and the remainder of long-wools and cross-breds. These proportions also represent approximately the constitution of the flocks in

* The exports to the United Kingdom and other foreign countries from ports in New South Wales amount to about £6,500,000 annually, but considerable quantities of New South Welsh wool are sent to Victoria and re-exported from Melbourne, while, on the other hand, New South Wales imports wool from Queensland and other colonies and re-exports it.

the other colonies of the mainland. New Zealand ranks next to New South Wales as an exporter of wool, her cargoes in the three years mentioned above having amounted, on the average, to the sum of £4,000,000 per annum, this being the estimated value of the fleeces exported out of an annual clip obtained from a sheep stock of 20 million head. In New Zealand the merino has been displaced to a large extent by cross-breds, which are now the most numerous breed in the colony. This change was mainly brought about by the inauguration of the trade in frozen mutton. Formerly the fleece was the main consideration of the flock-master, the carcase being of little value except for boiling down for tallow; but in order to meet the rapid growth of the demand for frozen mutton, a heavier type of sheep was required, and thus a great impetus was given to cross-breeding from long-woolled rams—Lincolns and Leicesters—with merino ewes, while Down breeds and Down crosses have also been encouraged owing to their value in producing early lamb and mutton for freezing. New Zealand cross-bred wools find a ready sale, and their reputation is established in the markets of the United Kingdom and other countries. Queensland is credited with practically the same number of sheep as New Zealand, but she does not participate so largely as the latter colony in the export trade in wool. The annual value of her direct shipments of this staple is estimated at about £1,750,000, but her indirect exports through neighbouring colonies, mainly through New South Wales, amount to another million sterling yearly. The flocks of Victoria number 13 million head, and those of South Australia 6 millions. Wool figures in the outward trade accounts of Victoria to a much greater extent than is warranted by the production of fleeces in the colony, but this is due, as has already been stated, to the fact that the article is imported in considerable quantities from New South Wales for re-exportation. The total value of the cargoes of wool despatched from Victoria is estimated at about £4,000,000 yearly, while those shipped from South Australia are valued at about a fourth of that sum. The capabilities of Western Australia as a sheep-breeding colony are not yet fully known, but it is believed

that the southern districts will eventually be largely occupied by sheep runs, and that the northern territories will probably be found suitable for the breeding of cattle and horses.

The United Kingdom purchases the bulk of the wool exported from Australasia.

It will have been anticipated from the preceding paragraphs that the exports of dead meat from the seven Australian colonies consist for the most part of frozen mutton, of which considerable quantities are shipped annually to British ports. New Zealand enjoys the largest share of this trade, furnishing about 75 per cent. of the total quantity exported, while New South Wales contributes the bulk of the remaining 25 per cent.* Frozen and preserved beef is exported to the value of between £700,000 and £1,000,000, mainly from Queensland and New South Wales. In this connection it may be noted that the former colony possesses over 50 per cent. of the 13 millions of horned stock existing in Australasia.

Relatively to the size of her flocks, New South Wales exports remarkably small quantities of mutton: sheep being still there kept mainly for their wool, and the carcases of large numbers of them being converted into tallow in default of a better method of disposal. This circumstance affords a partial explanation of the large exports of tallow from the colony, which amount in value to nearly £750,000 annually, or about half the sum at which the total exports of this article are estimated in the above statement. The other half is shared in almost equal proportions by Victoria, Queensland, and New Zealand.

New South Wales has also the largest interest in the export trade in skins and hides, which is made up for the most part of sheep skins. Hides are exported in very small quantities, mainly from Queensland.

Australasia is, as we have already seen, mainly a pastoral country, but a diversified system of agriculture is tending to become more and more important in the rural economy of

* Information relating to the frozen mutton trade of Australasia will be found in article on the Frozen Mutton Trade of New South Wales, published in Vol. II., No. 2 (September, 1895), of this Journal.

several of the colonies, though on the mainland this has taken shape hitherto mainly in the direction of the cultivation of wheat. It is in Victoria and South Australia that this development has chiefly proceeded. These two colonies possess nearly three-fourths of the entire Australasian acreage under wheat (4,000,000 acres), and the first-named has the largest surface devoted to the production of barley and potatoes. In New Zealand the rearing of fat sheep for the frozen mutton trade has made arable cultivation an essential branch of sheep-farming. Considerable quantities of oats are grown in this colony, and the production of roots, clover, and artificial grasses is extending yearly. The average yield per acre of wheat in New Zealand is more than double that of any of the other colonies except Tasmania. In New South Wales wheat growing is gaining ground mainly in the districts where sheep-farming has hitherto prevailed, but the area under all cereals is under a million acres, and of this wheat occupies 600,000 acres, and maize 200,000 acres. Queensland has made little progress in wheat-growing, and at present her production of this grain, like that of New South Wales, does not suffice to meet the requirements of her population. It is held, however, that there is an extensive region of range land in Queensland, particularly on the Darling Downs, which could be converted into fertile wheat-fields; and it is believed that within the next decade the colony will be in a position to export wheat, inasmuch as the squatters are themselves becoming the largest wheat-growers, and are continually bringing large areas of grass land under the plough. In Tasmania, wheat is grown on over 60,000 acres, and in Western Australia, on 42,000 acres, whereas, in Queensland, less than 30,000 are devoted to this cereal.

The shipments of wheat from Australia to foreign countries, mainly the United Kingdom, consist almost entirely of the surplus available from the production of the wheat-fields of Victoria, South Australia, and New Zealand, the greater portion being contributed by the first-named colony.

Dairy farming has been introduced with success into nearly

all the colonies of Australasia, and in Victoria and in New Zealand, and to a smaller extent in New South Wales, the production of butter, and also of cheese in the case of New Zealand, is a well established industry. Butter is exported from these three colonies, and in small quantities from South Australia; but Victoria is responsible for about 75 per cent. of the total exportation, and New Zealand supplies the greater part of the remaining 25 per cent. Cheese is exported mainly from New Zealand. In 1895 there were 155 butter and cheese factories in Victoria, of which 121 were employed in butter making only. The total output from these factories and from dairy farms in the same year was estimated at 35,589,000 lbs. of butter, and 4,153,000 lbs. of cheese. Since 1895 there has been an addition to the number of factories operating in the colony. New Zealand possessed last year 318 dairy factories and creameries, the greater number being situated in the North Island. Many of these establishments in New Zealand are engaged in the manufacture of cheese, of which the colony exported in 1896-97 over 78,000 cwts., of the value of £151,000. Dairy factories are also springing up in increasing numbers in New South Wales, where 395 of these establishments were in operation in 1894. The quantity of butter produced in the colony in 1895 was estimated at 27,359,000 lbs., of which about two-thirds was made in factories. The increasing popularity of dairying in New South Wales is said to be connected with the introduction of the factory system. South Australia has only a relatively small surplus of butter for exportation, while Queensland does not produce sufficient quantities of the article for her own consumption.

Attempts have been made in some of the colonies to open up an export trade in live cattle and sheep with Europe, and it is held in colonial circles that the trial shipments already made have shown that such animals can be placed in fair condition on the European markets, notwithstanding the long sea passage, and that at some seasons of the year the trade may be a remunerative one. But hitherto these shipments have been of an experimental character, and there are few signs of any immediate development under existing con-

ditions.* Horses are shipped to India for cavalry remounts, and colonial bred horses have been exported occasionally to the United Kingdom.

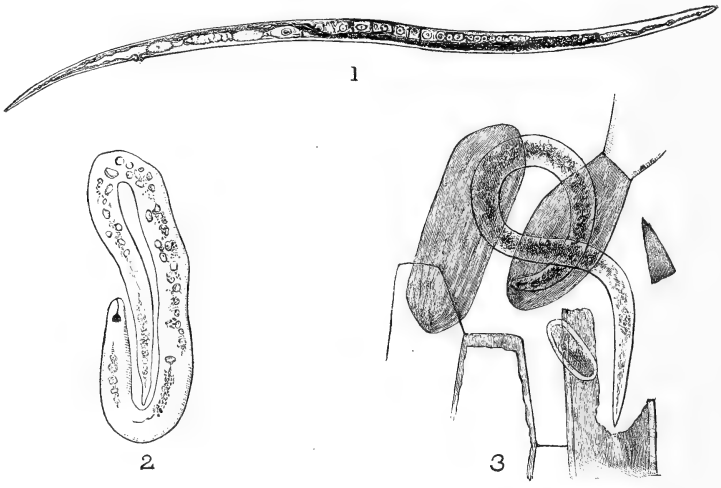
Other articles of agricultural produce exported from Australasia include fruit (mainly Tasmanian apples), rabbits, poultry, eggs, and honey, but the value of the shipments of these products is inconsiderable. Tasmania sends between £40,000 and £50,000 worth of apples to the United Kingdom yearly, but the bulk of the produce of the orchards of the island is consigned to the mainland of Australia.

Australia is for the most part self supporting so far as regards food products, and the imports of agricultural produce into the seven colonies from the United Kingdom and other foreign countries amount in value to only about half a million sterling annually. New South Wales, New Zealand, and Queensland are the largest consumers of foreign food products. The principal articles imported from abroad by the first-named colony are condensed milk, malt and hops, and fruit. Queensland imports large quantities of brewing materials, and New Zealand's chief purchases are fruit, seeds, and manures.

*The largest shipments were made in 1895, when New South Wales sen 1,400 cattle and 800 sheep; Queensland, 250 cattle; New Zealand, 1,800 sheep; and South Australia 210 sheep; all to the United Kingdom.

INJURIOUS INSECTS, ETC.

The Stem Eelworm (*Tylenchus devastatrix, Kühn.*)



1. Eelworm. 2. Larva just emerged from egg.*
3. Eelworm and egg in plant tissues.
(All much magnified)

The mischief effected by this species of the eelworms, or *Anguillulidæ*, known as the stem eelworm (*Tylenchus devastatrix*) appears to be extending. During the past two or three years many complaints have been received of the failure of various kinds of crops from some unperceived cause, which has on examination proved to be the stem eelworm. Wheat, oats, hops, clover, and onions were the principal subjects of this infestation submitted for investigation, and in all cases eelworms of the species *Tylenchus devastatrix* were found in the stems of the affected plants.

As a rule, there were no signs of any insect or fungoid attack, except in some of the diseased clover plants, in which

* This figure is reproduced from Dr. Ritzema Bos' *L'Anguillule de la Tige*, with his courteous permission.

there were fungi present, together with the eelworms. In some specimens of diseased clover plants from large fields where "clover sickness" was rampant, the stems of the affected plants were swarming with eelworms; there was also in the same plants injury caused by the action of the fungus *Sclerotinia trifoliorum* (*Wall*), described by Mr. Carruthers in a report to the Council of the Roya Agricultural Society in February, 1898, as doing much harm to young clover in various parts of England. It was most difficult to determine whether the *Tylenchus* or the fungus was the primary source of the injury to the clover plants. It is well known that eelworms are a frequent cause of "clover sickness," so that their occurrence with the *Sclerotinia* fungus was probably accidental.

All kinds of clovers are subject to infestation by these eelworms, which are very destructive to *Trifolium incarnatum*, especially if it is sown late and is weak, as it often is during the winter, in which case it soon succumbs to the onslaught of the eelworms. Common red clover also suffers extremely from "sickness" due to eelworms, especially when it is sown with an oat crop, and entire fields are often utterly ruined. In clover left for two years bare patches, which extend widely in the second year, are often seen. While the clover plants are small, and during winter when their growth is practically arrested, the eelworms get the upper hand of them.

Infestation of wheat plants is not very common, but it does sometimes occur, and causes much harm, particularly in wheat sown in the spring. A very bad infestation of spring wheat was reported in 1897. The plant was even and strong at the time when the ears should have been put forth. No ears, however, were produced during the summer, nor any ear-bearing stems, and the wheat plants through the summer and up to December resembled long coarse grass. They were brilliantly green in December, from 8 to 10 inches long, and had tillered abundantly. The densely matted stems were swollen at the crown of the roots, many being bulbous, or "tulip-rooted." Upon stripping off the sheathing leaves the inner leaves were found in a flabby

condition, and examination showed that they were swarming with eelworms. The sheathing leaves also had eelworms within their tissues, and their edges were curved outwards. Eelworms were discovered in the bulbous stems, though not nearly in such numbers as in the inner leaves. It was evident that eelworms had materially damaged the plants, and quite prevented the production of fruiting stems. Their greenness and vitality had, however, been preserved by the heavy dressings of manures which had been applied.

Oat plants frequently sustain serious injury from this eelworm, notably in seasons when their growth is checked by the weather, and they cannot grow away from the attack. Their stems are short, yield little or no corn, and become bulbous or "tulip rooted." In a bad attack the roots become shortened, contorted, and light in colour, and are evidently of little use to the plants. The edges of the leaves are twisted outwards in a peculiar fashion.

Rye does not appear to suffer much in this country from the eelworm, though in France and Germany it is often seriously injured. Barley is not attacked.

Bean plants are occasionally infested by this eelworm; the lower parts of the plants become swollen, and growth is stayed.

Onion plants infested by eelworms in the early stage of their growth have swollen and twisted leaves, in which eelworms may be found in large quantities. When the bulb is more advanced, it swells unnaturally in the upper part, and is soft and pulpy. It splits open, the outer folds fall away, and the whole bulb soon decays, owing to exposure to weather and the failure of the roots, which have dried up, to afford nourishment to the plant. In the sound parts of the bulbs eelworms are found in numbers in all stages of existence, but not in the decayed parts.

Hyacinths and other flower bulbs are affected by this eelworm in the same manner as onions.

The roots of hop plants which had become "nettleheaded," as hop-planters say, and of which the growth was arrested, while the bines slipped down the poles and the leaves became distorted, were examined, and considerable numbers

of *Tylenchus devastatrix* were found in them. There were other species of eelworms present, especially that known as *Heterodera Schactii*, which was seen in abundance upon the smaller roots.

Some grasses are attacked by *Tylenchus devastatrix*, notably, *Anthoxanthum odoratum*, *Holcus lanatus*, and *Poa annua*. Weeds are also infested by it, as the daisy, common shepherd's purse, spurrey, buttercup, cornflower, sow thistle, and others.

The full-grown eelworm (*Tylenchus devastatrix*) is about the twenty-fifth of an inch long. Its length varies somewhat in different root plants. In appearance it resembles a tiny eel, with both ends sharply pointed. It has, in common with other species of *Tylenchus*, a sharp spear-shaped point within the gullet, which has been well described as an "exertile spear on a trilobed base," serving to pierce the tissue of the root plants and to extract their juices. The eggs are oval, and sometimes oblong in shape, as shown in the figure, and are found in the tissues of the host-plants, together with larvæ and fully developed eelworms. The growth and progress of the larva can be seen in various stages within the transparent eggs. When the larvæ come from the eggs, Dr. Ritzema Bos says, they are about one-seventh of the size of the adult eelworm, and resemble them in outward appearance, though their internal parts differ somewhat. The larva undergoes several changes, or moults, before it becomes a perfect eelworm. Close examination of the habits of the *Tylenchus devastatrix* indicates that it lives and feeds in living tissues. When the tissues of the host-plant decay or die, the eelworms and larvæ either fall to the ground and enter it, or the larvæ and the eggs remain in the decaying and dead parts, and become dried up with them. The larvæ have the power of resuming animation and active life after they have remained in a perfectly dry condition, in dead tissues, or in dry soil, even for several years. The eggs also can regain vitality after animation has been suspended for two to six months, according to their condition when the period of suspension commenced. Dr. Ritzema Bos revivified larvæ which had

been dried up for 2½ years by putting them in water, and he is of opinion that life may continue latent even longer than this. It is apparent that this faculty enormously increases the chances of the distribution and spread of this nematode, which may be carried into fields, market-gardens, allotments, and gardens in this dried up state with manure made from infested straw, in these days cut close to the ground, or with hay composed of the infested clover and grasses taken into yards, stables, and sheep-folds.

Great cold causes suspended animation in the *Tylenchus* larvæ. Want of food—the absence of food-plants—brings the larvæ in the soil up to the surface where life is suspended in the dry soil, in which state no food is required. This eelworm may be conveyed from one field to another on the feet of men (according to Kühn), horses, and other animals, also on the wheels of carts, waggons, and barrows, and by the wind on dusty and sandy soil. In the case of onions and flower bulbs, infested pieces of leaves, and bulbs left in fields or gardens, or thrown into refuse-heaps, pigstyes, and yards, are fertile sources of infestation. In infested clover-leys ploughed for oats, wheat, or beans, there are always roots containing live eelworms, harrowed up and left on the surface of the ground, which leave the roots when they begin to dry up, or remain in the larval form within them in suspended animation, until mild temperature and moisture revive them, when they forthwith attack the crops near them. The larvæ may also be preserved in this form in the stems of wheat, oats, and bean plants, and will be ready to infest any host-plants near when circumstances favour their emergence from a torpid condition.

As one important means of preventing, or diminishing, the spread of this nematode after infested clover, oat, wheat, and bean crops, the land should be deeply ploughed with a skim coulter affixed to the plough, so that the roots, stubble, and haulm are deeply buried; those left on the surface should be harrowed together with a fine harrow, taken off the land, and burned. In very bad cases it would be right not to let plants liable to this attack follow infested crops, or to give as long a fallow as possible after the deep ploughing. After

infested onion crops, deep ploughing should follow in fields, with the careful removal of pieces of bulbs and leaves. In allotments and gardens, deep digging, or, better still, trenching, must follow infested onions, and all refuse must be cleared away and burnt, which is comparatively easy in small plots. During the season when onions are pulled for use, and when onions are stored and taken from the store from time to time, all rejected parts must be burnt as the onions are used. Onions should not follow onions on the same plot for some time after an attack. Affected flower bulbs must be at once dug up and burnt.

It is not sufficiently realised that precaution and care are as necessary to be observed with regard to this and many insect infestations, as in epidemic disorders.

Remedial measures in attacks of eelworms are, and must be, from the microscopic nature of the nematodes, and their habit of living within the tissues of their host-plants, mainly of an indirect character, and consist in manurial applications to force the infested plants along, or to applications of an alterative tendency, to alter their juices and make them less suited to the parasitic invaders. For clover crops thus infested, the best manures or alteratives have been found to be mixtures of sulphate of potash and sulphate of ammonia. A mixture of 3 cwt. of sulphate of potash and 1 cwt. of sulphate of ammonia proved to be a very good remedy. Another mixture of 1 cwt. of sulphate of iron, 1 cwt. of sulphate of potash, and 1 cwt. of sulphate of ammonia, was nearly as good, checking the infestation and helping the plants on. Four cwt. of dissolved bones mixed with 2 cwt. of sulphate of potash per acre form a valuable dressing for infested clover. Another mixture found to be useful was composed of 4 cwt. of kainit, 2 cwt. of sulphate of iron, and 3 cwt. of superphosphate.

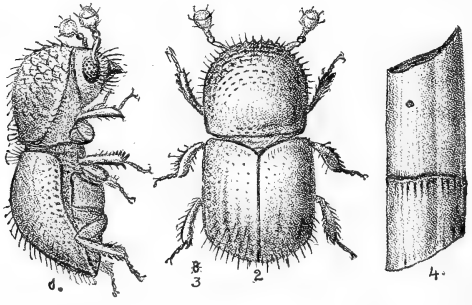
Oat plants suffering from eelworms have been much benefited by a composition of 5 cwt. of kainit, $1\frac{1}{2}$ cwt. of sulphate of ammonia, and 1 cwt. of sulphate of iron; also from a mixture of 2 cwt. of sulphate of potash, and 2 cwt. of sulphate of ammonia. An application of 1 cwt. of sulphate of iron, 3 cwts. of nitrate of soda, and 1 cwt. of sulphate of potash, likewise had good results.

For infested wheat plants the mixtures mentioned would be applicable.

For onions invaded by eelworms, sulphate of potash, sulphate of iron and nitrate of soda, mixed together at the rate of 2 cwts. of each per acre, will be found most beneficial. This mixture must be applied directly the plants flag—and in most cases this infestation is noticed very early—chopped in close round the plants. Good results have followed from a dressing of 5 cwt. of kainit, 1 cwt. of sulphate of iron, and 2 cwt. of finely powdered guano.

As this eelworm infests many weeds, this is another reason, if one were wanted, for keeping land clear. The principal host-weeds are shepherd's purse, spurry, blue cornflower, sow thistle, buttercup, soft crane's bill, teazel, daisy, forget-me-not, rib grass, climbing buckwheat, and squills. It also infests lucerne, buckwheat, the chive and several species of hyacinth, besides the various species of grasses enumerated above. Dr. Ritzema Bos gives a list of no less than 34 host-plants of this eelworm.

AN ORCHID BEETLE (*Xyleborus perforans, Wall.*).



1 and 2, Beetle highly magnified; 3, Natural Size; 4, Infested Stem, showing hole made by the insect.

In December last some stems of *Dendrobium Phalænopsis* Orchids were submitted to the Board for examination, as many of these plants in an orchid house were sickly,

and some of them were evidently dying. There were small round holes, rather smaller than No. 6 shot, in the stems or pseudo-bulbs, and on splitting these lengthways galleries, made apparently by a boring insect, were found in them. Some of these galleries were simple, running up and down the stems, others had branches at right angles, but in most cases only one short branch was noticed. Beetles were found in various parts of the galleries and branches, together with larvæ and pupæ, though the latter were generally at the ends of the branches. Occasionally a solitary beetle was discovered on the outside of a stem, boring into it in order to establish a fresh colony. It was clear that the beetles within the stems were injuring the plants by exhausting the sap, and feeding upon their soft tissues. The owner of the orchids stated that he had not one-tenth of his Dendrobiums left, and many of those remaining were much injured by the drastic treatment adopted to get rid of the invaders. The beetle appears to be partial to Dendrobiums, and especially to *Dendrobium Phalænopsis*. A few other instances of the infestation of orchids by the beetle have been notified in this country, though at present it is by no means common; but it is feared that it will become so, as it is imported with orchid plants from various countries. In the present case it is believed that the orchid plants were imported either from New Guinea, or Ceylon, in which latter country the beetle is well known to exist, as well as in most tropical and sub-tropical regions. Mr. Blandford states that it has not been recorded from any country in the European geographical region.

The female beetle has wings, is slightly larger than the male, and not quite so broad, being rather less than the tenth of an inch long. The beetle is shiny brown, or chestnut coloured, when full grown. Immature beetles are of a paler hue. The short five-jointed antennæ are terminated by clubs.

The insect bores a hole in the stems of the orchid plant—it was seen at this work—and when it reaches the centre of the stem, or thereabouts, it makes a gallery with a branch, or branches, but owing to the soft, sappy nature of the orchid

stems these galleries are difficult to trace. In most cases the galleries, or branches, end in a deep pocket in which eggs, larvæ, pupæ, and perfect beetles are found.

The larva is without legs, milky white, and rather more than the tenth of an inch in length. Some authorities hold that the larva does not bore; it has, however, strong jaws, evidently made for biting and boring, and it certainly seemed that the larvæ found in orchid stems were actively at work. The pupa is white. Mr. Blandford, the well-known authority upon this beetle, thinks that the period of development from the egg to the perfect state is about ten weeks.

Infestation is primarily due to the winged female beetle, which either bores a hole for escape from the stem in which she was generated, or emerges through the original hole in the stem, and flies to fresh plants, wherein she makes circular holes and deposits eggs.

This beetle is very destructive to sugar canes in the West Indies and other countries. It also attacks beer casks, and sometimes causes considerable losses from leakage, in consequence of borings into the wood, especially in India.

When this infestation is noticed in orchid houses the infested stems, or pseudo-bulbs, must be cut away and burned. It would be desirable also to re-pot infested plants and to use fresh crocks, and entirely new sphagnum, moss, and other materials.

THE PINE APHIS (*Lachnus pini*).

This Aphis was found in January upon good-sized deodar trees (*Cedrus deodara*), 20 feet in height, to which it was causing considerable injury. It was said to have turned the leaves of some of these trees yellow by the continuous sucking of their juices.

It is most unusual to find aphides materially damaging plants in the winter, but this infestation was reported from Devonshire, where the climate is mild, and the whole season had been quite abnormal until the fall of snow in the latter part of February. Aphides are frequently found alive in winter in small numbers, but do not then cause

harm to plants, and it is almost unprecedented to see them in quantities and seriously injuring trees in that season.

The Pine Aphis attacks several species of firs, especially the Scotch fir, but is not often seen upon deodars. It is one of the largest of the British aphides. The wingless viviparous female is brown in colour, and, according to Mr. Buckton, there is also a darker variety. It has very long legs, particularly the hind pair, and an extraordinarily long beak or rostrum, with a spearlike point, with which it pierces the firs at the base of the "needles," and extracts the sap. Its body is covered with short hairs. Upon the needles of the pieces of deodars sent for examination to the Board little groups of fine white threads were seen, evidently produced by these aphides.

The most serviceable remedy would be to syringe the infested trees with solutions objectionable to the insect, so as to make its food distasteful. Nothing could be better for this than the composition used for freeing hop plants from their peculiar aphides, made by mixing 8 lbs. of soft soap and the extract of 6 lbs. of quassia chips, to 100 gallons of water. This should be syringed all over the trees by means of garden-engines with strong pumps; or, if the tree is too high, knapsack machines for spraying may be used by men upon ladders. This must be done very carefully, and the syringing would probably have to be repeated.

THE FRUIT TREE BEETLE (*Scolytus rugulosus*).

Several complaints have been received of injuries to apple trees, caused apparently by the boring beetles known as *Scolytus rugulosus*. The tips of the smaller branches were almost honeycombed by the larvæ, many of which were found alive and active in the channels made by the insects. It seemed that the larvæ were more fond of the soft bark, as they were more frequently found there, than of the harder wood of the branches. Most of them, however, were in bark that was decaying or nearly

dead, and it was exceptional to find them in healthy bark, which rather confirms the statement in Kollar's *Treatise on Insects*, "that it is probable that this beetle only attacks trees that are sickly." There seems to be no doubt that this insect has a decided preference for sickly trees and parts of branches where there is the least flow of sap. The larvæ have been frequently found in the tips of shoots of trees injured by frost or other weather influences, as well as near scars from canker, knife cuts, and knots.

It is not clear that the beetle attacks perfectly healthy and vigorous trees, nor, on the other hand, that it does not attack such, and it is certain that the onslaught of these beetles upon a young tree that might be temporarily sickly from some other cause would prevent its recovery and hasten its destruction.

The fruit tree beetle not only attacks apple trees, but pear, plum, cherry, and peach trees are also frequently infested by it.

The dying away of the ends of the twigs and smaller branches, and the shrivelling up of the leaves, are signs of infestation. On close inspection, many round holes, of which the diameter is hardly equal to that of an ordinary pin's head, will be seen in the bark of badly infested trees. These holes will be found to lead to the surface of the woody parts, upon which will be found channels or grooves, made lengthways up and down in the bark, and between the bark and the wood; on either side of these are smaller channels, in which larvæ are ensconced.

Life History.

The female beetle may be seen flying towards the end of April. It bores a hole in the bark of a tree and forms a channel, as described above, about three-quarters of an inch long, in the bark close to the wood, placing its white eggs with some regularity upon either side of this. Larvæ come from the eggs in a few days, and begin to feed on the bark, making branch channels nearly at right-angles with the main channel, called in German "Mutter-gang," or mother-passage. At the end of these branch channels the

larvæ make a small hollow, generally in the woody part, to form receptacles for pupation, in which the pupæ are lightly covered with frass. After pupation, the beetles bore holes through the bark and escape. There are at least two generations of this insect during the year, and the winter is passed in the larval state, so that active injury is continued almost throughout the year.

The beetle is barely one-tenth of an inch long, and black in colour, except the ends of the wing covers, legs, and the much-clubbed antennæ, which are of a russet colour. The thorax and wing covers are much wrinkled and punctured. The larva is about one-tenth of an inch long when extended, is milky white, without legs, and has a chestnut-coloured head furnished with strong black mandibles. The upper part of the body is considerably thicker than the lower part, and it lies in a curved position.

Methods of Prevention and Remedies.

Not much can be done against this insect in the way of prevention or remedy. All the branches and limbs that are infested should be cut off and burned during June, before the beetles have escaped. Where a tree is badly infested in various places it should be cut down and burned during June, so that larvæ, pupæ, and beetles may be destroyed.

In orchards, fruit plantations, and gardens where there is considerable infestation, it would answer to adopt the American recommendation to ring, or girdle, worthless trees that are either unfruitful, or already decaying. This is done by cutting a strip of bark round the trunk in the spring, and letting it remain until the following June, to serve as a trap for the beetles, which will be attracted and lay eggs in it. It should then be cut down and burned during the ensuing June, before any of the beetles escape from the colonies within.

It is feared that the application of noxious compositions would be quite useless as a means of preventing the beetles from boring into trees, unless all the trees in an orchard or fruit plantation were similarly treated, which would be a difficult and costly process. When the beetles have once

got into the bark no amount of syringing would affect them. In the case of gardens with two or three trees only, these might be syringed, or daubed over, with a very thick wash of an offensive nature, such as paraffin emulsion, before the leaves and buds showed, so as to prevent egg-laying where an attack is feared. When there is decided infestation in the case of a few trees in a garden, it would pay to examine every branch carefully, and cut away and burn all those which have the typical holes.

AGRICULTURAL AND MISCELLANEOUS NOTES.

Agricultural Inquiry in Hungary.

Allusion was made in the last number of the Journal (p. 350) to the agricultural inquiry undertaken in Hungary in 1895, and some information was given from the first volume published. Another volume, containing detailed statistics of the area under cultivation and of the harvests in 1895 and 1896, together with comparisons for earlier years, has now been received, and the following particulars are taken therefrom.

The area defined as "cultivated" in the present return is nearly equivalent to what we should consider arable, and includes the area under bread grains, other cereals, pulse crops, industrial plants, "hoed" crops, and miscellaneous crops, such as cabbages and the like.

The total of this "cultivated" area in the entire kingdom of Hungary in 1895 was 32,846,000* acres (taking the hectare as equal to 2·47 acres); that in Hungary proper being 29,467,000 acres. The agricultural statistics of Croatia-Slavonia only date from 1885, whereas comparable data for Hungary proper are available since 1870. Comparisons of the area and production of the whole kingdom can therefore only be made with 1885 and subsequent years; all information relating to earlier periods necessarily referring to Hungary proper only. Taking the area of the latter, this has shown an almost continuous increase from 24,736,000 acres in 1871, *i.e.*, about 19 per cent. It is interesting also to note the steady decrease in the area

* The unit of area in the first volume was the "cadastral joch" (1·42 acre); in the volume under notice the hectare is used; hence the figures in the present article differ slightly from those previously given on p. 350.

returned as under fallow each year, this having amounted to 23 per cent. of the whole arable area in 1871-72, and attaining only 12·5 per cent. in 1895. In this respect, however, Croatia and Slavonia have advanced more rapidly; the area under fallow in these two provinces having amounted to nearly 23 per cent. in 1885, as compared with 17·5 at the same date in Hungary proper, and being now only 12·25 per cent.

With respect to the area under individual crops, omitting the very small area in the territory of Fiume, for which details are only available for 1895-96, the area under bread grains increased until the period 1890-94, but there was a slight decline during the two years 1895-96; the area cropped in the whole country amounting to 11,500,000 acres in 1896, or 41 per cent. of the whole cultivated area (excluding fallow and land uncropped owing to damage by the elements, insects, etc.). Of these grains, in 1896, 8,308,000 acres were under wheat, almost entirely winter wheat, and 2,806,000 acres under rye. The wheat area has gained considerably since 1871, while the rye has somewhat fallen off. Of other cereals, barley and oats occupied in 1896 a nearly equal area, *viz.*, 2,665,000 and 2,546,000 acres respectively; these two grains have not exhibited very much change in area of late years.

The class grouped in the Hungarian returns as "hoed crops," which includes maize, sugar beet, potatoes, and fodder roots, generally exhibits an increase during the period, most marked in the case of sugar-beet—a comparatively small area—and fodder roots; these two areas having increased, in Hungary proper, by 241 per cent. and 190 per cent. respectively between the decade 1870-9 and 1896. Maize covered an area in 1896 in the whole kingdom of 6,047,000 acres; potatoes of 1,244,000, sugar beet of 187,000 and fodder roots of 364,000 acres.

Artificial grasses and clover also show a large increase in Hungary proper, from an average of 768,000 acres in the decade 1870-9 to 1,927,000 in 1896; the area in the whole kingdom in the latter year was 2,151,000.

On the other hand, industrial crops—rape, tobacco, flax,

and hemp—have declined, except flax; the most serious diminution being recorded in the area under rape, which is now but little more than half what it was during the seventies. The areas under these crops in 1896 were: rape, 133,000 acres; tobacco, 82,000 acres; flax, 45,000 acres; and hemp, 159,000 acres. The area under peas, beans, and lentils has also declined.

In addition to the "cultivated" area, which has been hitherto dealt with, the acreage under "natural hay" is given as 8,745,000 acres, in 1895 and 1896. This shows an increase of 17 per cent. over the average of 1890-4, which average would appear to have been nearly stationary for some years previously.

Vineyards formed the object of a somewhat minute investigation, particulars being required as to the age of these plantations, the proportion planted upon immune soil, statistics of phylloxera, the kind of wine made from the fruit, etc., etc. Their area amounted in 1896 to 611,000 acres. This acreage has steadily declined since 1885, when it amounted to 1,076,000 acres. A special inquiry placed it at 1,050,000 acres in 1872 in the entire kingdom (including Croatia-Slavonia).

The yields of all kinds of crops show an increase, generally progressive, during the last twenty-five years. Comparisons of single years are always uncertain, and averages are given as much as possible. Nevertheless the average yields in the decade 1870-79 appear very low, and the average of the quinquennium 1890-94 is for almost all crops nearly double that of the first-named period, although the rise is not so abnormally great in comparison with 1880-89. Dealing chiefly with the averages of 1890-94, the production of wheat was 18·1 bushels per acre, having been 15·4 in 1885-89 (the production in Hungary proper being placed at only 10·4 during the decade 1870-79); while it further rose to 19·4 in 1895, and was 18·61 in 1896. Of other cereals, the yields in the quinquennium named were rye (winter), 16·8; barley, 20·5; oats, 24; and maize, 20·7 bushels per acre. Potatoes gave 44 cwts.; clover, lucerne, and sainfoin, 25 cwts.; and natural hay nearly 20 cwts. to the acre.

The total production of breadstuffs in the Kingdom of Hungary during recent years is given as follows :—

Period.	Wheat.	Rye (Winter).	Total Breadstuffs.*
	Thousands of Bushels.	Thousands of Bushels.	Thousands of Bushels.
Average, 1885–9 - -	119,950	42,204	173,320
,, 1890–4 - -	146,017	48,298	205,330
1895 - - - -	161,523	44,441	213,885
1896 - - - -	154,637	48,694	211,696

* Including also mixed rye and wheat, spring rye, and spelt.

AGRICULTURE IN BAVARIA.

The cereal harvest in Bavaria in 1896 appears to have been on the whole slightly below the average of the preceding decade, only oats yielding a quantity very little above the average. Potatoes were also a little under the average, and owing to a much larger percentage of diseased roots, the quantity of healthy tubers was considerably diminished. Beetroot, whether for sugar or fodder, meadow hay, and lucerne returned an abundant yield, but the quantity of turnips was rather low.

The latest statistics of live stock relate to the year 1892, when there were 369,035 horses, 3,337,978 cattle, 968,414 sheep and lambs, and 1,358,744 pigs. A revision made in 1893 gave only 2,989,953 cattle and 1,258,662 pigs.

An interesting table of the average retail prices of certain common articles of agricultural produce in Bavaria in the years 1877 and 1896 shows that nearly all these commodities have fallen more or less in value during the twenty years, the only serious exceptions being meat (but pork has fallen), while eggs and beer have remained practically stationary.

One of the chief agricultural industries of Bavaria is the timber trade. It is estimated that 6,197,000 acres, or one third of the total area of Bavaria, is under forest. In Upper Bavaria, however, it is stated that the export of timber is decreasing, while the import of foreign timber is increasing.

Complaint is made of high railway rates, and especially that they affect Bavaria's export to Baden and Wurtemberg, which can import timber cheaply from elsewhere, owing to low river and sea freights. An important branch of the timber trade is the oak and fir bark industry. The timber trade in the district known as the Bavarian Forest benefited by the trade revival of 1895-6, and higher prices were obtained. Wages in the saw-works range from 1s. 6d. to 2s. 6d. per diem. In the Munich district building operations caused a great demand for timber, and prices rose accordingly. At the same time the Bavarian Forest glass industry is stated to have suffered by the development of railways, which facilitated the export of timber and provided new markets for it, causing a great rise in the price of the firewood needed for glass making.

Another important Bavarian industry is brewing. In the year ending June 30, 1896, 4,017,000 bushels of malt are estimated to have been used in the Munich breweries, while about 66,000,000 gallons are annually produced in that city. The total production of beer in Bavaria in 1896 was 356,359,000 gallons, of which 3,751,000 gallons were white beer. The total amount of malt used was 19,670,000 bushels. Exports amounted in the year to 55,891,000 gallons, 6,832,000 gallons going to foreign countries, while the consumption per head of the population is estimated at 412 pints. Some complaint is made of the competition from North German breweries, which have considerably increased of late years. It may be noted that the brewing of beer in Bavaria is effected with water, malt, hops, and yeast only, the addition of any other substance during or after brewing being a punishable offence. Only germinated grain, *i.e.*, malt, can be used in brewing, and the excise is based on the volume of malt. The malt tax varies, according to the quantity used by the brewer, between 5*s.* and 6*s.* 6*d.* per hectolitre (about $2\frac{3}{4}d.$ to $3\frac{1}{2}d.$ per gallon). There is a drawback of 2*s.* 7*d.* per hectolitre (1·4*d.* per gallon) on beer exported from Bavaria.

[*Foreign Office Report on the Trade and Agriculture of Bavaria for* 1896-7.—*Annual Series No.* 2024. *Price* $1\frac{1}{2}d.$]

AGRICULTURE IN SOUTH AUSTRALIA.

In a recently published report on the Agricultural and Live-Stock Statistics of South Australia for the year ending 31st March, 1897, it is stated that there has been no appreciable change in the area brought under agricultural settlement during the last five years throughout Australasia, the cultivated area having averaged under ten millions of acres, of which about one-fourth, or 2,584,000 acres, were in South Australia. There has been a decrease of 1·57 per cent. in the area under cultivation, and of 3·94 per cent. in the number of sheep since the year 1892-93.

In proportion to population, there are in South Australia 7·38 acres under cultivation per head; in New South Wales, 1·29; in Victoria, 2·44; in New Zealand, 2·21; in Tasmania, 2·85; in Western Australia, 1·51; and in Queensland, 0·65 acres; the average for the whole of Australasia being 2·26 acres per head. The average value of the agricultural produce in Australasia in 1894-5 was £3 18s., and in South Australia £5 8s. per head of the population. The average quantity of land under tillage in South Australia is 90 acres for each individual engaged in farming pursuits.

The principal crops cultivated in this colony include wheat, cereal hay, oats, barley, peas, and potatoes. During the period under review two-thirds of the whole area was under wheat, nearly five acres being sown for each individual of the population. The total number of acres under wheat was 1,693,045, as compared with 1,520,580 acres in 1892-3, showing an increase of 172,465 acres, or 11·34 per cent. But the area under wheat in 1892-3 represented a minimum, and, although there has been a recovery since that year, the acreage is still considerably below the extent sown in 1889-90, or during the period 1880-5. The colony continues to grow nearly one-half of the entire wheat crop of Australia.

During the ten years ended 1894 the average yield of wheat in Australasia was about ten bushels to the acre, while in South Australia it was only seven. The statistician of New South Wales has stated that, owing to the favourable conditions of cultivation a yield of seven bushels in South Australia is financially as satisfactory as one of fifteen

bushels in New South Wales, or of twenty bushels in New Zealand.

The wheat harvest of 1896-7 was a failure, owing to severe drought. Over 600,000 acres, or more than a third of the entire crop, remained unreaped, and it became necessary for the Government to provide seed-wheat for many farmers who would not otherwise have been able to crop their land. These advances were made by way of loans secured on land, under the administration of the local district councils. The total quantity of grain reaped was 2,804,493 bushels, repreresenting 1·66 bushels per acre sown, or 2·58 bushels per acre reaped. In 1892-3, the last year in which similar statistics were collected, the harvest yielded 9,240,108 bushels, or 6·08 bushels per acre, that season being a fair average.

The following table exhibits in summary form the South Australian wheat harvests during the last seven years for which figures are available :—

Year.	Area.	Produce.	Yield per Acre.
	Acres.	Bushels.	Bushels.
1883-4	1,846,151	14,649,230	7·93
1884-5	1,942,453	14,621,755	7·53
1889-90	1,842,961	14,577,358	7·91
1890-1	1,673,573	9,399,389	5·62
1891-2	1,552,423	6,436,488	4·15
1892-3	1,520,580	9,240,108	6·08
1896-7	1,693,045	2,804,493	1·66

The hay crop in South Australia is, after wheat, the most important. In ordinary seasons the crop usually yields one ton to the acre, but only half this quantity was obtained in 1896-7. After favourable seasons a fair reserve of cereal hay is made as an insurance against the heavy losses in draught and dairy stock which follow the oft-recurring periods of drought.

Oats can only be grown successfully in the cooler parts of the colony, and the crop now forms an important item in the production of the southern districts and in Yorke Peninsula, the area sown having increased to 40,215 acres. The area under barley was 14,484 acres, but the cultivation of this crop does not make much progress.

Potato cultivation is principally carried on in the south-eastern district, where soil and climate are exceptionally favourable to the growth of the tuber; but a considerable proportion (one-fourth) is grown by market gardeners and others in the hilly districts to the east and south of Adelaide. The total production was 16,139 tons from 6,417 acres, or 2·52 tons to the acre.

Subsidiary crops, the returns of which vary greatly each season, were grown on 3,936 acres, or 294 acres less than in 1892-3. The cultivation of sorghum has considerably increased, indicating that the necessity of growing summer feed for dairy stock is becoming more generally recognised.

CULTIVATED AREA OF DENMARK.

The preliminary results of an inquiry made in July, 1896, as to the utilisation of the land in Denmark have recently been published by the State Statistical Bureau at Copenhagen. The information was collected by means of schedules drawn up by the Bureau, with the assistance of the Royal Danish Agricultural Society, and approved by the Ministry of Agriculture. The schedules were distributed by the local authorities to occupiers of land throughout the kingdom, and when the necessary details had been furnished the documents were forwarded to the Statistical Bureau.

According to the preliminary statement now issued, the total area of the Kingdom of Denmark in 1896 was 9,371,829 statute acres, as compared with 9,365,301 statute acres in 1888, the increase of 6,500 acres being accounted for partly by reclamation of land from the sea, and partly by rectification of the returns. The total area at the two periods was distributed as follows:—

Area.	1896.	1888.
	Acres.	Acres.
Land under crops, fallow, and grass	7,003,143	7,061,766
Woods, forests, plantations, and nurseries	698,916	602,115
Watercourses, railways, highways, building land, and country roads	219,550	213,452
Marshland, moors, wastes, and dunes, and athletic grounds	1,450,220	1,487,968
	9,371,829	9,365,301

Of the total area under crops, fallow, and grass in 1896, cereals occupied 2,986,774 acres, or 42,630 acres less than in 1888. The only corn crops in which an increase of acreage is shown are rye, oats, and mixed corn, the aggregate extension amounting to 84,266 acres; in all other cereals there is a contraction representing a total decline of 126,896 acres, so that the net decrease is 42,630 acres, as already stated. The reduction of the wheat area is from 119,691 acres in 1888 to 84,812 acres in 1896—this is equivalent to a decrease of 29 per cent. Barley was grown on 689,524 acres in 1896, a decline of 45,320 acres since the last enumeration; and buckwheat occupied 29,000 acres, or a little over half the area devoted to the same crop at the earlier period. Among the grains in which an increased area is recorded are rye and oats. The area devoted to the former, which is the principal food-staple of the country, was 716,648 acres in 1896, or only 24,000 acres more than in 1888; but in the acreage under oats there is an expansion of 33,000 acres, the latest returns giving this crop a total area of 1,083,458 acres. Mixed corn, according to the recent inquiry, was grown on 360,580 acres, as compared with 333,377 acres in 1888; about one-fifth of this crop is cut green for fodder.

In the category of green and root crops potatoes alone have remained practically stationary. Spergula, or spurrey, is returned as occupying 18,554 acres, or 28,000 acres less than in 1888, but this apparent decrease is due largely to a re-classification, as spergula cut green for fodder is included under "fallow" in 1896, whereas it was not separately returned in 1888. Sugar-beet is credited with 31,249 acres this being double the acreage similarly cultivated eight years before.* In the land sown with typical fodder roots—viz. beet, turnips, kohl rabi, and other roots—the present returns show an increase of 70,000 acres, the returns for the two periods being 183,812 acres in 1896 and 113,469 acres in 1888.

Although fodder roots are grown to a much larger extent in Denmark, the area under grass of all kinds has slightly declined. The acreage of the various descrip-

* An account of the progress made by the Beet-sugar industry in Denmark is contained in Vol. III., No. 1, of this Journal, June, 1896.

tions of grass land, inclusive of marsh pasturage, at the two periods is returned as follows :—

Grasses.	1896.	1888.
	Acres.	Acres.
Clover and Rotation Grasses - -	655,287	456,585
Permanent and Temporary Pastures -	1,680,634	1,811,417
Meadows - - - - - -	561,142	565,593
Rough Pasture - - - - -	71,415	248,855
Marsh Pasture - - - - -	160,197	126,409
Total - - -	3,128,675	3,208,859

It will be noted that while clover and rotation grasses have gained nearly 200,000 acres, permanent and temporary pastures have lost about 131,000 acres. The considerable diminution shown in the acreage of rough pasture is due partly to re-classification, land formerly returned as rough pasture being now included under other headings, and partly to the fact that some of the land has been brought under the plough. Taken in connection with the development of dairy farming in Denmark, the changes to which reference has just been made, viz., the incre ase in the area of roots and the extension of the cultivation of clover and rotation grasses, indicate that stall-feeding, which is largely practised by Danish dairy farmers, is becoming more and more popular.

Marsh pastures, which embraced 126,409 acres in 1888, are credited with 160,197 acres in 1896, the difference is in this case also said to be due mainly to re-classification, land being now classed as marsh-land which was formerly entered as moor and meadow land. Thus if the total areas under all forms of grass at the two periods are compared the difference represents a contraction since 1888 to the extent of 80,184 acres.

Market gardens, orchards, and pleasure gardens, which covered 69,737 acres at the earlier inquiry, are returned as occupying 78,699 acres: viz., market gardens and orchards 65,280 acres, and pleasure gardens 13,419 acres. The area of fallow in 1896 is given as 676,036 acres as compared with 637,696 acres in 1888.

CULTIVATED AREA OF SERVIA.

In 1893 an exhaustive inquiry was conducted by the Statistical Division of the Ministry of Agriculture at Belgrade in order to ascertain the area of cultivated land and its distribution under various crops in the Kingdom of Servia. According to the published results of this inquiry, which have only recently been issued, the total area of the country is 11,930,742 acres, of which 6,686,459 acres were productive at the date of the inquiry.

The cultivated or productive land was distributed as follows:—

	Acres.
Land under crops	2,999,494
Pastures and meadows	1,479,877
Rough grazing and marsh pasturage	603,495
Vines	150,645
Orchards	257,044
Woods	1,195,904
Total	6,686,459

Of the land returned under crops, cereals occupied 2,789,199 acres, and of this area maize accounted for 1,313,562 acres, while 783,162 acres were sown with wheat. Among the remaining cereals oats ranked next to wheat with 261,735 acres; barley followed with 227,540 acres; and then rye with 147,755 acres. The estimated production of each of the crops named in 1893 is given as under:—

Crops.	Total Production.	Yield per Acre.
	Bushels.	Bushels.
Maize	16,882,268	13
Wheat	8,707,687	11
Barley	2,412,129	11
Oats	2,672,526	10
Rye	1,226,425	8

In addition to the grain crop already mentioned, spelt was grown on 45,516 acres; beans and peas on 21,023 acres; millet on 3,412 acres; and buckwheat on 6,518 acres.

The area under all kinds of vegetable and green crops was 75,708 acres, of which 20,883 acres were devoted to potatoes and 20,056 acres to cabbages.

Industrial plants were grown on 41,221 acres, the principal crop being hemp, which occupied 33,176 acres.

The inquiry also embraced a census of the number of draught animals, and of the number of ploughs. The total number of draught animals in 1893 was 479,125, comprising 366,741 oxen, buffaloes and cows, and 112,384 horses.

DAIRY INDUSTRY OF SWEDEN.

In a recent Foreign Office Report,* Mr. Arthur Herbert, First Secretary to H.M. Legation at Stockholm, has collected some useful information on the dairy industry of Sweden, and on the conditions which enable Swedish butter to compete in the English market with that produced at home or in other countries.

The importance of this industry in Sweden may be realised by the fact that the item of dairy produce figures as second in value on the list of exports from that country. With a population of 5,000,000, Sweden owns some 2,600,000 cattle, and it is estimated that the annual value of the milk produced is a little under £10,000,000 sterling, assuming that there are 1,500,000 milch cows yielding an average of 350 gallons per annum, and reckoning the milk as worth $4\frac{1}{2}d.$ per gallon.

Apart from the small dairies making butter and cheese for home or local wants, there are some 1,800 large dairies, of which 1,420 are devoted to butter-making only, and 210 to cheese-making, the other 170 manufacturing both butter and cheese. Of these large dairies some 625 are "estate dairies," which deal only with their own milk; 320 are "estate dairy factories," which purchase milk from outside to supplement their own production; 515 are factories purchasing all the

* "Report on the Dairy Industry of Sweden."—Miscellaneous Series No. 439 [C. 8649—10].

milk required; and 340 are co-operative dairies. These latter would appear to be increasing rapidly, and, it would seem, at the expense of the other classes. The total amount of milk converted into butter and cheese by these dairies is reckoned to have been about 175,000,000 gallons in 1896, most of which was made into butter, the production of this comestible amounting to some 512,000 cwts.

The greater portion of this butter is exported to England either directly or through Denmark. The cheese, of which nearly 150,000 cwts.—whether whole or skim-milk cheese—were made in 1896, is consumed in the country, some 2,000 or 3,000 cwts. only being exported. The imports into Sweden were on the average of the three years 1894-96, 15,000 cwts. of butter, and 4,500 cwts. of cheese.

With regard to the exports of butter, it appears from the Swedish returns for 1895 that 335 tons of butter were sent to Norway, 8,270 tons to Denmark, and 15,450 tons to Great Britain. These exports were valued at nearly £100 per ton. The British trade returns for 1896 show that in this latter year some 16,200 tons were received direct from Sweden, or rather more than one-tenth of our total importation of butter; while, in addition, Mr. Herbert states that 8,150 tons of the butter we received from Denmark were of Swedish origin. Only two countries (Denmark and France) ship more butter to this country than does Sweden. Of other dairy products, Sweden also supplied Great Britain (in direct trade), in 1896, with 45 cwts. of margarine, 16 cwts. of cheese, 140,000 cwts. of bacon, and 19,000 great hundreds of eggs; all these quantities, however, representing but a very small fraction of our total imports of these commodities.

Most dairies use separators driven by steam-power, but in some the Swartz process of separating the cream by means of ice is employed. In all exporting dairies the cream is pasteurised, and in most instances is soured with butter-milk or pure cultures. The butter is churned in Holstein churns, and generally packed in casks. It is despatched once a week to Malmö or Gothenburg, refrigerated compartments being used in the hot season.

The co-operative dairies are the largest, the number of

their members sometimes amounting to over 400. Some of these treat from 1,200 to 3,300 gallons of milk a day, while the largest of all deals with 4,000 gallons. The farmers generally take back all the skim and butter-milk, which is used for fattening calves and feeding pigs; some dairies keep calves and pigs in order to utilise these by-products A certain proportion of the skim-milk is used for cheese-making. The profits of co-operative dairies are not taxed, because such businesses are not considered to form a separate trade apart from the farms contributing to their produce.

The assistance given by the State to dairying amounts to an annual sum of about £2,700, and agricultural societies also contribute £5,300. In addition to these sums, nearly £5,000 per annum is spent upon the two State Agricultural Colleges of Ultuna and Alnarp. For instruction in dairying there are, besides the two colleges just mentioned, a higher dairy school for experts, a lower dairy school for men, seven dairy schools for women, and 24 dairy stations for women. A Chief Dairy Inspector is also maintained by the State, and there are 23 dairy experts paid by the local agricultural societies in the various counties, the duty of these latter being to travel about their districts in order to give advice and information.

About £1,472 (26,500 kronor, of which 10,000 kronor are provided by the Government) represents the annual cost of inspection of butter; practically the whole of this sum represents expenditure on analyses. The inspection of dairies is intrusted to the communal authorities, and the local doctors appointed by the State or commune are also authorised to inspect dairies and report any insanitary conditions.

Mr. Herbert concludes by remarking that cheapness is secured, not because the value of the land is less in Sweden, nor because the climate is better, nor because the other expenses of the agriculturist compare favourably with English. The reason must be sought in their co-operative methods of manufacture, which effect very great economies; and it is to these, coupled with the thoroughness of technical

agricultural education in that country, that the British farmer who does not understand how a profit can be made out of Swedish butter at present prices must look for an explanation.

HOP PRODUCTION IN THE UNITED STATES.

The Board have received from the United States Department of Agriculture an intimation that no official estimate of the production of hops in that country has been made since that published in one of the Reports of the Census of 1890. In a circular issued on the 18th January last, Mr. John Hyde, the Statistician of the Department at Washington, reproduces the following particulars as to the acreage and production of hops in the United States, as given in the census of 1890. The aggregate production of hops in 1889 for seventeen States, upon 50,212 acres, was 39,171,270 lbs. The area and production in the five leading States were as follows :—

States.	Acres.	Lbs.
New York - - - -	36,670	20,063,029
Washington - - - -	5,113	8,313,280
California - - - -	3,974	6,547,338
Oregon - - - -	3,130	3,613,726
Wisconsin - - - -	967	428,547

The Census Bulletin No. 143 gave the yield of crops in 1890 as 36,872,854 lbs., then worth £2,300,000, the average yield per acre being, in California 1,648 lbs., in Washington 1,626 lbs.; in Oregon, 1,155 lbs.; in New York, 547 lbs.; in Wisconsin, 443 lbs.; and in the whole United States 780 lbs. The average prices therein stated were, for 1889, about 5d. per lb., and for 1890 about 1s. 3d. per lb., the first-named year being one of over-production.

The circular of January last quotes the following later estimates from an unofficial source.

The Annual Review of "The California Fruit Grower" of

October 31st, 1896, gives the hop production of California for a series of years as follows :—

Year.	Bales.	Year.	Bales.
1890 - - -	28,000	1893 - - -	51,000
1891 - - -	36,000	1894 - - -	67,500
1892 - - -	39,000	1895 - - -	52,000

It also gives the following figures of acreage and production of the Pacific coast of the United States for two years, viz.:—

States.	1894.		1895.	
	Acres.	Bales.	Acres.	Bales.
California - - -	8,600	67,500	8,500	52,000
Washington - -	10,000	49,000	5,700	28,800
Oregon - - -	15,000	63,000	16,500	99,500
Total - - -	33,600	179,500	30,700	180,300

The United States Agricultural Department considers the foregoing to be the only reliable information current relating to hops in America.

THE DAIRY INDUSTRY OF ITALY.

In a Report to the Foreign Office on the dairy industry of Italy, Mr. Consul-General Chapman states that, according to statistics published by the Ministry of Agriculture, the production of cheese in the year 1894 amounted to 1,441,000 cwts., and of butter to 309,000 cwts.

The cheese which is chiefly produced in Italy is the "grana" (or Parmesan cheese), so called from its granulated texture; next in importance are the "gorgonzola," "emmenthal," and "stracchino" of Lombardy," the "fontina" of the valley of Aosta, and the "cacio cavallo" of Rome and Southern Italy. The latter is, however, produced in small quantities also in Lombardy.

One hectolitre (equal to 22 gallons) of milk yields from 12 to 12¾lbs. of cheese, and 5 to 6lbs. of butter. Grana cheese cannot be exposed to an elevated temperature without injury, yet it stands long journeys if properly packed.

The whey that remains after the cheese is made is generally utilised in Italy to make the ricotta, which is produced in the following manner:—The whey is heated up to 80deg. C., and worked up with the "follatoio," a long stick, to the end of which a round wooden disc is affixed. In less than an hour the ricotta appears on the surface of the liquid, and is collected and placed in baskets to dry. The ricotta is either eaten fresh, or else salted and dried in the oven when it is used by the peasantry as cheese.

The principal centres of production are the provinces of Milan (Parma, Lodi, Codogno), Como (Lecco), Pavia, Reggio Emilia, Parma, Belluno, Modena, in the north of Italy, where abundant pastures for the feeding of cattle are always available.

There is no special law in Italy for the protection of the dairy industry, except that of July 19th, 1894, which regulates the sale of the substitutes of butter, and prohibits and punishes the adulteration of butter with margarine. Besides that law there is a special service of surveillance in the principal cities, and public officers for the chemical analysis of all alimentary products.

Generally, no preservative is employed but common salt, which is added to the butter exported. Some large exporters of Venetia and Lombardy, however, employ a special salt obtained from the mines of Lungro (Calabria Citeriore), which, although more suitable than common salt is said to be still inferior to the salts of Egestorff, Lüneburg, Stade, and Linden, employed abroad for foreign cheeses of a superior quality.

[*Foreign Office Report, Miscellaneous Series. No.* 450. *Price* 1*d.*]

LIVE STOCK IN GERMANY.

The Board have received, through the Foreign Office, a memorandum, forwarded by Her Majesty's Ambassador at Berlin, dealing with the subject of live stock in the German Empire. The reduction shown in the number of sheep of nearly 50 per cent. is the most striking feature of these statistics; but with this important exception there has been an increase in the number of animals, especially swine, in that country during recent years. The following table shows the figures in three census years:—

Census Year.	Horses.	Cattle.	Sheep.	Pigs.	Goats.
Jan. 1873 -	3,352,200	15,776,700	24,999,400	7,124,100	2,320,000
Jan. 1883 -	3,522,500	15,786,800	19,189,700	9,206,200	2,640,000
Dec. 1892 -	3,836,300	17,555,700	13,589,600	12,174,300	3,091,300

In spite of this development in numbers, there have been many complaints from those interested in live stock. These have not originated so much in the price of cattle or their products, as from the losses caused by disease, and especially by foot-and-mouth disease and tuberculosis.

The following table shows the average annual imports and exports in the three years 1875-77 and 1894-96:—

Year.	Horses.	Cows.	Pigs (exclusive of Sucking Pigs).	Sheep.
	Imports.			
1875-77 -	66,897	106,194	1,131,818	470,177
1894-96 -	97,513	116,635	387,938	1,683
	Exports.			
1875-77 -	39,563	61,366	300,897	1,178,137
1894-96 -	8,386	3,959	17,570	310,826

The figures show that the exportation of live stock since 1875 has largely decreased, while the importation of cattle and horses during the last twelve years has increased. The rise in the number of horses imported is particularly remarkable. Of the arrivals of these latter in 1896, 4,285 came from North America, as compared with 2,479 in 1895, 11,633 from Austria-Hungary, 15,876 from Denmark, 21,453 from Belgium, and 31,822 from Russia.

The effect of the weather on stock raising during each year is considerable, for in years of scarcity of fodder, cattle often have to be sold at ruinous prices, as their owners cannot afford to feed them during the winter months.

The following table shows the annual prices of meat at Berlin and Munich at intervals of five years since 1881 :—

YEARS.	BERLIN.				MUNICH.
	Beef (Dead Weight). Mean of highest and lowest.	Pigs (Live Weight). Highest Price.	Calves (Dead Weight). Lowest Price.	Mutton. Medium Price.	Cattle (Live Weight). Mean of highest and lowest.
	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*	Per cwt. *s.* *d.*
1881	50 2	56 3	54 7	52 5	...
1886	47 7	48 0	44 0	47 2	35 9*
1891	56 6	52 0	51 10	50 1	39 3
1896	52 8	43 11	50 8	48 2	35 11

* Price for 1887.

These prices exhibit some curious features, particularly the reduction of mutton values, in the face of the great diminution in the flocks of the Empire. The great fall in the prices of pigs in 1895 and 1896 amounting at Berlin to nearly *7s.* 8*d.* per cwt. (live weight) is attributed to a great increase in pig-breeding, brought about by the high prices of former years.

AGRICULTURAL EXPORTS OF URUGUAY.

In a report published by the Foreign Office on the trade of Uruguay during 1896-7, Mr. Alfred Grenfell, Her Majesty's Consul at Montevideo, states that the wealth of the country consists principally in her numerous flocks and herds, which have of late been greatly improved by crossings with English sheep of Lincoln and Southdown breeds, and with Shorthorn and Hereford bulls. The horses of the country have, to some extent, been improved from the original native breeds by the introduction of English horses of various types from the race-horse to the cart-horse. Certain efforts have been made to establish an export trade in cattle and sheep by enterprising British stock farmers, but apparently with unsatisfactory results, and the business seems to have come to an end.

The principal exports from Uruguay are distributed as follows : Great Britain receives nearly all the wheat, and the dried and preserved tongues, all the dried blood, nearly half the bones and bone-ash, one quarter of the salted hides, and a small quantity of horns and of wool. Brazil imports most of the flour and all the "*charque*" (dried salt beef), which is the food of the negro population of that country. France takes most of the horns, one-third of the dried hides, and one-fourth of the salted hides. The remainder of the dried hides are sent to Belgium and Germany. Calf skins go to Portugal, sheep skins to Italy and also to France. Wool is exported principally to Belgium, France, and Germany.

Although the quantity of grain exported is not large, Mr. Grenfell states that the Uruguayan farmers are beginning to realise that stock-breeding may not be the most remunerative industry, and it is probable that Uruguay may some day not far distant become a fairly large grain-producing country.

[*Foreign Office Report, Annual Series, No.* 2020. *Price* 1*d.*]

AGRICULTURAL EXPORTS OF THE UNITED STATES.

The following particulars as to the exports of agricultural products from the United States in the year ending June 30, 1897, are taken from the Statistical Abstract recently issued

by the United States Bureau of Statistics. The figures show that the total exports of domestic merchandise were valued at £215,000,000. The exports of agricultural produce were valued at £142,390,000, or just two-thirds of the total. In only two previous years, 1881 and 1892, each marked by abundant harvests in the United States, coincident with meagre crops elsewhere, was there a larger exportation of agricultural products than in the year under consideration; while as compared with the preceding year there was an increase of £23,665,000.

Cotton, wheat, and maize were among the articles contributing most to the augmentation of the agricultural exports. The combined increase in value of the exports of these three items amounted to over £15,683,000. In cotton, the increase was exceptionally large, amounting to £8,507,000, the total shipments being worth £48,102,286, in spite of the fact that the average export value fell from 4d. per pound in 1896 to 3½d. in 1897.

The wheat exports amounted to 79,562,000 bushels, valued at £12,483,370, this representing an excess of 18,911,940 bushels in quantity and £4,210,000 in value over the previous year. Exports of wheat were unusually small in 1896, but during 1896-7 a stronger foreign demand, occasioned by short crops abroad, called for increased exportation. For some years the shipments of wheat flour have exceeded in value those of wheat, but in 1896-7 the order was reversed, and the flour exports amounted to 14½ million barrels, of the value of £11,648,822, or £834,548 less than the value of the grain.

The increase in the exports of maize constituted one of the features of the foreign trade for the year; the consignments of this cereal exceeded by more than 76,000,000 bushels those of the preceding year, and amounted to a total of 176,916,365 bushels, thus surpassing all previous records by a wide margin. The value of the exports of maize for the year was £11,268,000.

The total value of the bread stuffs exported by the United States during 1896-7 amounted to £41,220,000, an increase of over £11,770,000 as compared with 1895-6.

Cattle exports showed an increase of, approximately,

£374,000 in value, the number of such animals being 392,190, against 372,461 in 1895-6. Horses increased from 25,126 to 39,532; sheep, however, decreased by about 50 per cent., although the number exported was considerably greater than in any recent year previous to 1894-5.

The exports of fresh beef, hams and bacon showed an increase of £1,609,000, whilst butter and cheese increased by over £646,000.

The number of eggs sent out of the United States increased from 328,485 dozen to 1,300,183 dozen.

With regard to fruit and nuts, the total export value was £1,612,000, or £429,000 more than in the previous year. The increase in the quantity of raw apples exported was considerable, the figures for 1897 being 1,503,981 barrels, which is one of the largest quantities ever exported in a single year. The price realised does not, however, appear to have been very favourable, as the value is stated at £494,000, or 6s. 7d. per barrel, whereas the average value for the previous five years was 10s. 5d. per barrel.

THE INDIAN GRAIN TRADE AND THE FAMINE.

In the Review of the Trade of India during the year 1896-7, Mr. O'Conor, Director-General of Statistics, states that India imports food grains from external sources on exceptional occasions only, as was the case last year in consequence of the widespread failure of the crops. The total importation of grain and pulse amounted to over 1,000,000 cwts., and included over 600,000 cwts. of wheat and 123,000 cwts. of barley. The corresponding total figure in the previous year was 294,000 cwts. The increase in the supply from external sources was, therefore, not large compared with the demand, and the reason given by Mr. O'Conor is that after the failure of the Indian harvests became known, in October, 1896, the prices of food grains in other countries advanced rapidly, the levels being such as to make importation unprofitable during a great part of the second half of

the year. Besides, the people turned to the inferior grains so far as they could be obtained, and to rice, of which, fortunately, there was an abundant harvest in Burmah.

The origin of the grain imported into India during the recent famine is detailed as follows:—24,000 tons of wheat—a gift from the charitable—were sent to Calcutta from the United States of America. Some wheat was also imported into Bombay from the United States, and from the Persian Gulf, whence there is generally a small and spasmodic import trade into Western India. Pulse was imported from the same region, and in smaller quantities from China, the Straits, Ceylon, Eastern Africa, and Egypt. Barley also was imported into Bombay from the Persian Gulf for brewing purposes, and jawar and bajra came from the same locality and from Eastern Africa. Oats (for horse-feed) were received from the United Kingdom and Australia. Rice was imported from the Straits, and other sorts of grain—chiefly maize—from the United States, the Persian Gulf Eastern Africa, and the United Kingdom. Of the total importation of food-grains more than half came from the United States, and most of the rest from Turkish ports on the Persian Gulf.

The total export of Indian wheat was 1,910,553 cwts., against more than ten million hundredweights in the previous year. The export occurred in the early part of the year, as the trade afterwards collapsed in consequence of the very bad crops, and of the retention for internal consumption of such wheat as was available for export.

The out-turn of the wheat crop in each of the principal wheat-growing provinces was as follows:—

PROVINCES.	Average (five years ending 1893-94).	1894-95.	1895-96.
	Tons.	Tons.	Tons.
Punjab	1,998,269	2,395,353	1,715,873
North-Western Provinces and Oudh	1,619,750	1,141,297	1,236,486
Bengal	459,000	486,300	345,800
Bombay and Sind	781,139	960,322	511,533
Rajputana and Central India	—	1,195,113	1,138,730
Central Provinces	730,981	502,275	431,689

The total deficiency in 1895-96 was thus about 20 per cent. compared with 1894-95, and that was also a bad year for at least two of the larger wheat-growing tracts. The bad harvest of the spring of 1896 having followed a poor harvest of other grains in the autumn of 1895, the demand for wheat for internal consumption was quickened, and prices rose rapidly, and maintained a very high level during the year, operating as a check on exports. The exports of wheat-flour fell from 74,114,000 lbs. in 1895-96, to 67,177,000 lbs. in 1896-97, nearly two-thirds of which had been shipped before the price of wheat rose to a prohibitive level. The trade in flour is directed mainly to the African and Arabian coasts, the bulk of the trade being from Bombay.

THE MALTING AND SEED BARLEY COMPETITION, 1897.

The Board of Agriculture have received a copy of the report of the judges at the Special Competition of Malting and Seed Barleys held in connection with the Brewers' Exhibition in October last.*

Compared with the exhibits of the previous five years, the proportion of British and Foreign samples shown is reported to have varied as follows :—

Samples of Barley.	1897.	1896.	1895.	1894.	1893.	1892.
English - - -	92	169	109	124	63	64
Foreign - - -	27	32	42	80	21	22
Total - - -	119	201	151	204	84	86

The falling-off in numbers in both sections is attributed to the character of the season and to greater discrimination in the selection of samples.

The number of English counties represented by the exhibits was 24, as against 30 in 1896. The judges state that the weight per bushel of the barleys of 1896 was not

* See also Article in the Journal for March, 1897, Vol. III., No. 4.

equalled in the competition of 1897, notwithstanding the high character of many of the barleys submitted for competition and the steady improvement shown in the cleaning of the grain. Only two English samples exceeded 60 lbs. per bushel, whilst in the foreign section one sample only attained to 58 lbs., and four of the exhibits fell below 49 lbs. The English samples weighed ranged from 54 to 61 lbs., whilst the foreign samples weighed between 49 and 59 lbs.

As regards the date of sowing, it is stated in the report that notwithstanding the extremely unfavourable conditions prevailing throughout February, the largest number of samples entered was sown in the fourth week of that month, and attention is again called to the fact that no prize fell to any barley sown after the commencement of April.

The date of harvesting, although not quite so early as in 1896, is reported to have shown very clearly the effect of rain upon the condition of barley samples, for while nearly half of the samples cut in the first and second weeks of August obtained prizes not a single sample cut in the third week obtained any commendation.

A prize was offered by the directors of the exhibition for the most instructive collection of samples of barley judged unfit for malting. This competition was confined to agricultural colleges, and full entries in this class would, it is believed, have great educational value; but the judges regret that no exhibits of defective grain were entered by any agricultural college.

EXPERIMENTS IN POTATO CULTIVATION IN IRELAND.

The sixth annual report of the Irish Congested Districts Board contains an account of experiments made in 1897 to test the relative merits of different kinds of potatoes, with a view to obtain varieties suitable to take the place of the Champion for a portion of the crop.

Experiments with eleven varieties were conducted on ninety-seven experimental plots: nine were grown on all the

plots, two varieties on seventy-seven plots, and one variety on twenty plots. It is proposed that these and other kinds shall be planted next year, and similar experiments continued, if desirable, in later years. The information now published relates mainly to the yield of the several kinds cultivated. The *Up-to-Date* was, under average conditions, the heaviest cropping main-crop potato of the varieties tried. The *Irish White* (which is believed to be the same as the variety called *The Gawkey*, in some districts) is reported as a very suitable variety for cultivation on poor, wet soil. The *Champion*, though usually inferior to the *Up-to-Date* on the experimental plots, maintained its position as a cropper as compared with any of the other varieties, and will probably continue to be a general favourite for the main-crop for some time to come. The *Beauty of Hebron* appears to be well suited for cultivation in congested districts in small quantities for early use, where it can be planted in dry, fairly good, well cultivated land. Other varieties gave satisfactory results, but they were not appreciated to any great extent by the owners of the experimental plots. The following table furnishes a summary of the results obtained in the five centres selected for experiments under the Board:—

Variety of Potato.	Number of Plots on which the variety was grown.	Number of instances in which the yield per Statute acre exceeded									
		10 Tons	9 Tons.	8 Tons.	7 Tons.	6 Tons.	5 Tons.	4 Tons.	3 Tons.	2 Tons.	1 Ton.
Beauty of Hebron	97	4	5	6	8	16	31	45	58	72	82
Up-to-Date - -	97	37	47	59	64	74	81	86	88	94	96
Antrim - - -	97	5	12	26	33	46	68	78	83	88	93
Wonder - -	97	1	1	2	7	12	21	39	55	68	78
Beauty of Bute -	97	6	14	20	32	42	63	73	79	84	90
Garton - - -	97	2	6	13	27	44	59	76	84	92	96
Main Crop - -	97	5	8	19	30	46	61	71	85	92	94
Irish White - -	97	7	13	30	43	58	73	86	94	95	97
Champion - -	97	8	19	35	50	64	79	89	92	94	97
Ardcairn Beauty -	77	2	6	13	21	36	50	66	72	76	77
Snowdrop - -	20	—	—	—	—	—	—	—	2	4	7

The *Up-to-Date* variety gave the highest yield in sixty-two plots, the *Champion* in eighteen, the *Irish White* in fifteen, and the *Beauty of Bute*, *Garton*, *Antrim*, and *Beauty of Hebron* in one plot. Two varieties produced an equal maximum yield in two separate cases.

DUCK BREEDING IN THE UNITED STATES.

A bulletin has been issued by the United States Department of Agriculture dealing with the standard breeds and management of ducks and geese in that country. According to this publication there are ten standard breeds of ducks in the United States, and of these the following six kinds, viz., the Pekin, Aylesbury, Rouen, Cayuga, white and coloured Muscovy, are considered profitable to raise. Of all the ducks none stand higher in popular esteem in the United States, for farm and practical purposes, than the white Pekin. The white Aylesbury ranks second to the popular Pekins for market purposes, but is not bred so extensively. The coloured Rouen duck is popular throughout the country and is considered one of the most profitable breeds to keep. It does not mature so early as the Pekin or the Aylesbury, but the flesh is very delicate, and the breed is acknowledged to be superior for table purposes, being easily fattened, while it is also hardy, prolific, quiet in disposition, and of beautiful plumage. The black Cayuga is distinctly an American duck, having been bred so long in the country that all trace of its origin is lost. Muscovy ducks are considered to be very unsatisfactory birds to keep on a farm with other poultry, owing to their quarrelsome and pugnacious nature.

During the last ten years duck-raising in the United States has developed into a flourishing industry. Prior to that time the duck was not considered a profitable fowl to rear, and its flesh was never prized very highly by the masses. Ducks were bred on ponds and streams, feeding mostly on fish and water insects; this food gave the flesh a strong fishy flavour, hence it was not particularly sought after. Artificial incubation and brooding, combined with judicious feeding, have been instrumental in the development of this industry, and there are now numbers of farms in the United States that are devoted exclusively to raising ducks, averaging from 5,000 to 20,000 birds as an annual output. The profits are stated to be excellent, and good incomes may be made when once the business is thoroughly mastered, but it is one which requires an apprenticeship and a thorough knowledge of the

industry before success is attained. Those who have been successful in raising ducks have learned the business much as one does any other vocation. The beginner is advised to start modestly, and increase his plant as his knowledge of the work increases. The average farmer in America, however, the writer of the bulletin observes, has all the facilities for breeding a considerable number of ducks, and may with a little outlay add considerably to his income.

According to American experience, it is not at all necessary that ducks should have access to water to be reared successfully, as they grow and thrive readily without it. Some duck-keepers have water on their farms and allow their breeding ducks the freedom of it; some allow their growing stock intended for market free access to water until they are eight weeks old, when they are penned and fattened for market. On the other hand, there are breeders who have no water on their farms, who are just as successful and send as many birds to market as those who have a pond or stream. The only noticeable difference between "upland" and "water" ducks is that the latter have prettier and cleaner plumage than the former.

THE RUSSIAN AGRICULTURAL BUDGET OF 1898.

In the Report of the Russian Minister of Finance on the Budget of 1898, the provision for the work of the Ministry of Agriculture and Domains amounted to £3,806,095, as against £3,560,401 last year. Of this sum the cost of administration is put down at £1,105,886, the amount devoted to the central administration being £147,173, and to the local administration £958,713. The cost of the constructional works, material, labour, etc., is estimated at £1,570,758. Provincial land taxes and communal shares in connection with the State forests are provided for to the extent of £460,061. Schools, model farms, and establishments for agriculture, forestry, and mining will absorb £208,043, and £188,689 is allowed for endowments. Sundry expenses, and an appro-

priation for the immediate needs of 1899, amount to £272,657. Provision is also made in the Budget for the State studs, £171,981 being allowed for this service.

The above amounts have been converted into English money at the rate of one rouble = 2·13 shillings.

IMPORTATION OF ANIMALS INTO BELGIUM.

With reference to the note on "Importation of Horses" into Belgium which appeared in the Journal of the Board of Agriculture for June last (Vol. IV., p. 95), subsequent decrees have modified the fees charged for the inspection of imported horses and other animals, and the tariff, as fixed by an Order of 23rd November, 1897, is now as follows :—

Horses: 3s. 2d. per head, if they have to undergo the mallein test; 2s. for others.

Cattle: 1s. 7d. per head, if they have to undergo the tuberculin test; 10d. per head for cattle over four months, and 5d. per calf under four months, if not subjected to the tuberculin test.

Sheep, goats, and pigs: 5d. per head for lots of one to five; ½d. per head above five.

Horses for the Indian Army.

The Indian Government has announced that an importation of about 1,850 horses suitable for army purposes will be required during the year 1898-9. The animals are divided into two classes, viz., (1) Australian, Tasmanian, and Cape horses, and (2) Arabs and Persians. The purchases will be made in Calcutta, Madras, and Bombay, by the army remount department whose depots will be open for the reception of horses from the 1st of November, 1898, to the end of the purchasing season. Horses and mares of all breeds will be received, but they must be within the prescribed age, four to six years, and, in case of Australian horses, 15 hands 1 inch to 16 hands high. Greys will not be purchased for horse and field artillery. The average price for an Australian or Cape

remount has been fixed at £45 sterling, which will be paid in rupees, at the Indian port of purchase, at the exchange rate for demand bills on London declared to be the opening rate for the day on which payment is made in the ordinary course of business by the Banks of Bengal, Madras, or Bombay, according to the place of purchase. The average price for Arabs and Persians is Rs. 700, and horses of this class should be not less than 14 hands 2 inches in height. Every horse presented for purchase will be valued separately, and higher or lower prices may be given, under such rules as may be made by the director of the army remount department; but the averages fixed above are not to be exceeded on the whole number purchased in any class.

Production of Phosphates.

A report recently presented to the French Chamber of Deputies, on a proposed law relating to the phosphate deposits of Algeria, contains some observations on the production of this fertiliser in different parts of the world in 1895. It is stated that the actual quantity of phosphates produced in the world may be approximately estimated at rather less than two and a quarter million tons. This total was obtained from four principal sources: France and Algeria produced nearly 700,000 tons, Carolina and Florida in the United States furnished from five to six hundred thousand tons each, and Belgium contributed about 250,000. The remainder, about 250,000 tons, was obtained from England, Spain, Canada, West Indies, Germany, and Norway. The production of phosphates in Carolina is believed to have reached its maximum in 1893, when 619,000 tons were extracted; in 1894 and 1895 the quantity fell to about 450,000 tons. This decline was due to the increased production of Florida, which advanced from 52,000 tons in 1890 to 589,000 tons in 1894, and 538,000 tons in 1895.

Agricultural Trade Unions.

A return issued by the Board of Trade contains particulars of the existence, at the end of 1896, of four trade unions of agricultural labourers in Great Britain, with a total membership of 2,314 persons. In 1892 there were seven such unions with 33,334 members; two of these, however, accounted for nearly 32,000 members between them, viz., the National Agricultural Labourers' Union, dissolved in 1895, and the Eastern Counties Labour Federation, dissolved in 1896. The four existing unions date from 1872, 1890, 1892, and 1895 respectively; the latest is at present the only Scotch union making a return, and comprises 1,541 members. Apart from purely agricultural unions, there are fourteen trade unions in connection with "general labour," whose members amounted in 1896 to 73,530, a figure not very different from the average of the preceding four years. It may be noted that the whole number of trade unions reported on in the United Kingdom at the end of 1896 was 1,330, with a total membership of 1,487,562 persons.

[*Board of Trade. 9th Report by the Chief Labour Correspondent on Trade Unions*, 1896. *C.* 8644. *Price* 1*s.* 4*d.*]

Granaries in Russia.

From information received through the Foreign Office upon the working of elevators in the chief centres of the grain trade in Russia, it appears that there are at present fifty-six elevators working in Russia, one of which belongs to a zemstvo (local council), another (at St. Petersburg) is a private concern, while the remaining fifty-four all belong to railway companies. The total capacity of these elevators is about 250,000 tons, and the quantity of wheat passed through them in 1895 amounted to some 725,000 tons or more. The largest is that of Norossisk, with a capacity of 48,000 tons; other important elevators are those at Nikolaevsk, Odessa, and St. Petersburg. The earliest elevators date from 1888, having been erected after the promulgation, in the spring of

that year, of the regulations concerning the storing of goods in warehouses, which laid down the general principles to be observed in controlling the operations of granaries. Each particular elevator has, in addition, its own special rules, dependent upon local circumstances; those owned by railways are modelled upon the ordinary laws affecting railway depots. Elevators where grain is mixed are under the control of the corn inspectors, and special regulations are in force concerning the sorting of the grain brought in; these regulations have up to the present been framed separately for each elevator, and are only valid pending the enactment of general regulations upon the subject. The operations undertaken by these granaries consist in discharging the grain into their store-rooms, weighing, storing, ventilating, weighing it again when taken out, loading it in sacks or on trucks, and cleaning, if desired. The price charged varies, but the average does not exceed 2¼d. or 2½d. per cwt., including storage during one month. The proprietors of the elevators may also issue documents concerning the sale of, and loans on, the grain stored; in some cases they are also empowered to issue warrants and execute orders on commission.

Pulse and Vegetables in Italy.

Upwards of thirty per cent. of the peas, lentils, beans, and other pulse crops cultivated in Italy are grown in the Neapolitan provinces; the total production in 1894 is put at 12,526,000 bushels, of which these provinces contributed 3,731,000 bushels. In 1895 the production was 11,220,000 bushels. The area under these crops has considerably increased since 1870, the average for 1870-74 being 1,608,000 acres, whilst in the three years 1893-95 it was 2,113,000 acres. The export of dried vegetables was 498,000 cwts. in 1895 and 794,000 cwts. in 1896, principally to Spain and Portugal, and in smaller quantities to Switzerland, Austria, Great Britain, and France. No statistics are available as to the production of fresh vegetables, but it is believed that their cultivation is

considerably extending. Cauliflowers, broccoli, artichokes, tomatoes, and other fresh vegetables form an important article of export in the winter ; the quantity sent abroad in 1895 was 315,000 cwts., and in 1896 380,000 cwts. Only 3,952 cwts. are stated to have been exported to Great Britain direct in the latter year. The exports of preserved fruit and vegetables have steadily increased during recent years ; in 1893 they amounted to 21,751 cwts., and in 1896 to 64,112 cwts., of the latter quantity 44,556 cwts. were shipped to Great Britain. The production of potatoes is practically stationary. In 1870-74 the average yield was 14,121,000 cwts., it fell in 1883 to 11,196,000 cwts., but in the three years 1892-94 it amounted to an average of 14,411,000 cwts. The export in 1896, chiefly to Austria, Malta, and Germany, was 484,000 cwts.

Canadian Legislation for Dairy Products.

There are three laws in force in the Dominion of Canada for the prevention of adulteration and fraud in the sale of Dairy Products. An Act passed in 1886 provides that oleo-margarine, butterine, or other substitute for butter, manufactured from animal substances other than milk, may be manufactured or sold in the Dominion. In 1889 a further measure was passed, which made it an offence to supply adulterated, skimmed, sour or tainted milk to any cheese, butter, or condensed milk factory, or to any maker of cheese, butter, or condensed milk, or to supply milk known to be taken from a diseased cow. Four years later, in 1893, the Dairy Products Act came into force. This Act forbids the manufacture or sale of filled or imitation cheese, *i.e.*, cheese made from skimmed milk to which has been added any fat which is foreign to such milk. Cheese made from skimmed milk is to be legibly marked and branded to that effect ; and no cheese or butter is to be marked or branded as Canadian unless such cheese or butter has been produced in Canada ; whilst foreign cheese and butter is to be branded with the name of the country of origin.

Landing of Cattle in Bulgaria.

Her Majesty's Agent and Consul-General at Sofia has informed the Foreign Office that a circular has been issued by the Bulgarian Ministry of Foreign Affairs, prohibiting the loading and unloading at a Bulgarian port of cattle which have not been previously examined by a veterinary surgeon and are provided with a certificate accordingly. The local administration concerned has also received instructions to proceed immediately after each unloading to disinfect the vessels, and the appurtenances which have been used either for loading or unloading.

Duty on Grain in Italy.

Information has been received at the Foreign Office from Her Majesty's ambassador at Rome that the Italian Government have decided to temporarily lower the duty on wheat and other grain imported into that country. A Royal Decree was issued in the official Gazette of the 23rd January to the effect that until the 30th of April next the customs duty on grain and wheat will be reduced to 5 lire per 100 kilogrammes, or about 2s. per cwt.

French Agricultural Banks Bill.

The Board have received information through the Foreign Office that a Bill for the subvention of agricultural banks was laid before the French Chamber of Deputies in December last. Upon the renewal of the privileges of the Bank of France, approved by the law of 17th November, 1897, this bank was required to lend the Government a sum of £1,600,000, repayable, without interest, in 1913, and also to make an annual payment of £80,000 into the Treasury. The present Bill proposes to place the £1,600,000 at the disposal of regional agricultural banks, without interest, until it has to be repaid to the Bank of France, while the annual £80,000 is to be lent to local associations. The regional banks must be based on the system of mutual credit, and must be constituted in accordance with the law of 5th November, 1894. Their principal function will be to operate as a centre for the local banks of the "arrondissement" in which they are

situate; they will discount the bonds, etc., presented by the local banks; they may grant loans on agricultural produce, and open current accounts with the smaller associations within certain limits. It is also suggested that they may undertake the functions of general warehouses. All local agricultural credit associations, provided they are mutual societies, will have the right of affiliation to the regional banks, and each will be free to take as many shares of the capital as it thinks fit; no association will, however, be entitled to more than one vote in the management of the bank. These shares may bear interest, not exceeding 5 per cent., but no other dividend may be declared. The constitution and statutes of these regional banks will be subject to the approval of the Council of State, while they will be under the supervision of the Ministries of Agriculture and Finance.

Inspection of Beef Exported from Sweden.

The Board have received from Her Majesty's Minister at Stockholm a copy of a Proclamation relating to the export of meat from Sweden, which came into force on the 1st February last. The new regulations provide that no meat from horned cattle shall be exported by sea to foreign countries without a certificate from a veterinary surgeon. This certificate can only be given after the veterinary surgeon has inspected the animal within forty-eight hours before slaughter, and also inspected the meat and intestines thereof after slaughter. The certificate may not be given if in the examination it is ascertained that the meat is tainted or in any way damaged, or if it comes from an animal suffering from any disease which renders it unfit for human food, or is otherwise unfit to be exported. This certificate must be produced to the customs authorities at the time of export, and the meat must also bear a label with the signature of the veterinary surgeon. These provisions do not apply to meat supplied for the provisioning of a vessel; whilst in the case of approved and stamped meat of animals killed in certain slaughter-houses, only a certificate from an authorised veterinary surgeon is required to the effect that no obstacle to exportation exists.

Export of Animals from Hungary.

The Hungarian export trade in sheep and swine has since the year 1894 suffered a very considerable diminution. The export of horses has, however, nearly doubled, the numbers having risen from 20,000 in 1894, to 39,000 in 1896, of the value of £1,170,000. This increase has been chiefly due to the fact that the Balkan States, and in particular Servia and Greece, have been large purchasers of horses in Hungary; saddle-horses have also been in demand for Italy.

The export of swine has during the last three years diminished by nearly 75 per cent., principally owing to epizootic diseases which have been prevalent in Hungary. The decline in the export value in three years is upwards of five million pounds, in addition to which the strong position formerly occupied by Hungary in regard to the pig trade with Austria and Germany is stated to have been lost. The number of pigs exported in 1894 was 1,363,000, in 1895 it was 713,382, and in 1896 it further fell to 255,868.

The export of horned cattle did not materially alter, the figures being 245,000 in 1894, 247,000 in 1895, and 238,000 in 1896. The number of sheep and goats exported, however, showed a considerable decline—viz., from 391,000 in 1894 to 327,000 in 1895, and 260,000 in 1896.

French Bounty on Flax.

The French *Journal Officiel* of the 18th February last contains an account of the debate in the Chamber of Deputies concerning the renewal for a further period of six years of the bounty on flax and hemp. As noticed in a former number of the journal, it was proposed to grant a sum of 2,000,000 francs (£80,000), *i.e.*, 500,000 francs less than during the six years 1892-97, for the encouragement of this culture, the minimum area for which a grower could claim a bonus being as before ten ares (a quarter of an acre). Some modification has, however, been introduced into these proposals during the debate on the Budget in the Chamber on the 17th February, and as a result it has been decided to

maintain at 2,500,000 francs (£100,000) the annual sum to be devoted in aid of this crop during the six years commencing with 1898, while the minimum area giving claim for a share of this money is reduced to five ares (one-eighth of an acre). The law is applicable to Algeria. The bonus is only to be accorded to cultivators, whether in France or Algeria, upon the condition that the flax and hemp is sown with the object of producing fibre, and not for the seed.

South Australian Live Stock.

A volume which the South Australian Government has recently published gives the result of the last enumeration of farm animals in the colony, made in 1896, and compares the figures with the corresponding census which took place three years previously. It is mentioned that during the interval the colony suffered greatly through a variety of untoward causes—viz., low prices of wool and stock, a succession of poor lambings, consequent upon dry seasons, and a drought unprecedented in extent and in duration.

Horses were returned as numbering 180,211, compared with 186,726 in 1893, a decrease of 6,515, or 3·49 per cent. Horned cattle up to the year 1893 showed a fair annual increase, especially in the far northern pastoral districts, where the increase had been as much as 50 per cent. in two years. At that date there were 411,793 head in the colony. The number now returned is 337,225, or a decrease of 18·12 per cent. in three years. The number of milch cows was 84,265.

The number of sheep was 6,323,993, showing a diminution in the flocks during the four years of no less than 828,054 head, or 11.58 per cent., this being attributed to the low prices of wool and mutton, due to successive bad seasons and the unprecedented drought, and to the consequent loss of lambs, and increase of vermin. South Australian wool to the amount of 47,042,861 lbs., valued at £1,228,991, was exported in 1896. In 1887, the number of sheep was 6,500,000, and the export of wool 42,602, 579 lbs.

The number of pigs was returned at 59,479; goats at 7,550; and poultry of all kinds at 920,397. Stock other than those specified included 592 camels, 906 donkeys, 139 mules, 490 Angora goats, 37 deer, and 742 ostriches.

Importation of Plants into Greece.

The Board have received through the Foreign Office a translation of a Decree, dated 4th January, 1898, embodying the measures taken in order to prevent the introduction of phylloxera into Greece. By this decree it is forbidden to import from any country, whether infected with phylloxera or not—(*a*) Any parts of vines, whether fresh or dry; (*b*) any living plants or parts thereof; (*c*) madder and liquorice; (*d*) stakes which have been used to support vines; (*e*) vegetable or mixed manure; or (*f*) vegetable soil and any kind of ships' ballast consisting of pebbles, earth, or mixed sand.

Importations, under certain conditions, are only permitted from Belgium, Holland, Denmark, Sweden, and Norway, where phylloxera does not exist. Grafts and cuttings of plants (vines excepted) for agricultural experiment stations may be imported through certain ports after many formalities.

The importation of the following articles *inter alia* is, however, permitted—viz., all kinds of dry seeds (including wheat and other cereals) and of dried fruits; dried pharmaceutical plants and bark used for tanning, hay and straw, as well as certain minor agricultural products.

Agricultural Machinery Exhibition at Kieff.

In the summer of last year an exhibition of agricultural machinery was held at Kieff, and some account of it is given in the Report for 1897 on the Agriculture of the Consular District of Odessa.* Although, as stated

* *Foreign Office, Annual Series, No.* 2,023. *Price* 1½*d.*

in the notice of the exhibition in this journal last year (March, 1897, p. 418), prizes were awarded only to Russian-made goods, foreign firms were well represented. British firms made very good exhibits of agricultural machines, notably threshing machines and engines. Reaping and harvesting machinery exhibits were most strongly represented by American firms; while Germany showed ploughs, seed-drills, etc., which were totally unrepresented by British manufacturers. It is remarked that these latter implements have been driven out of the market by those of German make, and that this is due to the unwillingness of the English firms, who twenty years ago practically monopolised the plough trade of Russia, to alter their patterns to meet the demands of their Russian clients. English makers of steam threshing machinery are well known in Russia; but it is stated that strong competition from Germany, as also from Hungarian workshops, is to be feared in this line. Inland manufacturers of agricultural and industrial machinery made a very creditable exhibition, and showed the rapid strides made by Russian makers, although foreign machines had always been used as models, and faithfully copied. In saw-frames as well as in branches of work involving the use of electricity Great Britain would appear to have left the field clear to Germany.

Flax-Growing in Washington.

The Annual Reports of the United States Department of Agriculture for the year 1896-7 contain the results of some cultural experiments in growing flax on Puget Sound. A ton of the flax straw grown there was sent to Ireland to be retted and scutched, and it is stated that the results showed that the Puget Sound region was equal in climate to some of the best flax-producing regions in Europe. The fibre is stated to be of superior quality, and resembled the best Belgian straw. As regards the quantity, over 7 tons of straw were produced upon 5 acres, and also about 70 bushels of saleable seed. As a result of the experiment, the growth

of this fibre is being stimulated on other parts of the Pacific Coast, and in Oregon particularly a considerable area is being sown for further experimental purposes.

Ornithological Exhibition at St. Petersburg.

The Board have received information through the Foreign Office that an International Ornithological Exhibition, under the authorisation of His Imperial Majesty the Emperor of Russia, will be held at St. Petersburg in the course of the present year.

Spanish Wheat Duty.

The Board have received information through the Foreign Office that the Spanish Government has decided to reduce the duty on wheat from 10½ pesetas to 6 pesetas per 100 kilos (from 2s. 3d. to 1s. 4d. per bushel) until the price falls to about 6s. 5d. per bushel, and to remove transitory duties from flour and bran. A royal decree reducing the duty accordingly came into force on March 4th, 1898.

Servian Wheat and Maize Duties.

The Servian Ministry of Finance issued a circular to the Customs on the 21st December last (old style), ordering the suspension of Customs dues on wheat and maize imported from Treaty as well as from non-Treaty States. The duties suspended are 75 centimes per 100 kilogrammes (4d. per cwt.) on maize, and 2 francs per 100 kilogrammes (10d. per cwt.) on wheat. The "obrt" (turn-over) taxes and other minor accessory Customs charges still remain in force.

REPORTS ON FOREIGN CROPS.

United States Harvest of 1897.

The report of the Statistician of the Department of Agriculture of the United States for January last contains the final estimate of the acreage and yield of the principal crops of 1897.

The total area and production of the cereals, potatoes, and hay are given below, the quantities being shown in Winchester bushels :—

Crop.	Area.		Production.	
	1897.	1896.	1897.	1896.
	Acres.	Acres.	Winchester Bushels.	Winchester Bushels.
Maize - - -	80,095,101	81,627,000	1,902,968,000	2,283,875,000
Wheat - - -	39,465,066	34,619,000	530,149,000	427,684,000
Oats - - -	25,730,375	27,566,000	698,768,000	707,346,000
Rye - - -	1,703,561	1,831,000	27,363,000	24,369,000
Barley - - -	2,719,116	2,951,000	66,685,000	69,695,000
Buckwheat - -	717,836	755,000	14,997,000	14,090,000
Potatoes - -	2,534,577	2,767,000	164,016,000	252,235,000
			Tons.	Tons.
Hay - - -	42,426,770	43,260,000	60,664,876	59,282,000

The average value of wheat on the farm was estimated at 3s. 4d. per bushel, an increase of 4d., as compared with last year, and of 1s. 2¾d. compared with the previous year. The wheat acreage exhibited a remarkable recovery, the total of 39,465,000 acres being the highest recorded with the exception of the years 1884 and 1891. The yield of 530,000,000 bushels was not equal to that of 1891, when

nearly 612 million bushels were produced; but the value per bushel is estimated to have been about five cents higher. The yield per acre in 1897 was about 13·4 bushels.

The average yield per acre of maize was 23·7 bushels, as compared with 28 bushels in 1896; and the total production, although not equal to that of 1895 and 1896, was more than in the three previous years. The total value of the crop, moreover, is estimated to have been greater than that of the preceding year, the figures being £104,390,000 against £102,293,000. The estimated value per bushel on the farm, which had declined in 1896 to 10¾d., rose during 1897 to nearly 1s. 2d.

CROPS IN INDIA.

The first general memorandum on the Indian wheat crop of the season 1897-98 was issued from the Statistical Bureau of the Government of India on the 26th December, 1897.

The memorandum stated that in Northern India the prospects of the wheat harvest were on the whole excellent, the areas sown in the Panjab and North-Western Provinces and Oudh being well up to the average, while the crop was coming along under favourable conditions. In Sind, also, there was a prospect of a large crop, the area sown having greatly exceeded the average.

Unfortunately, this was not the case with the other great wheat-growing regions. In Bombay, Berar, and the Central Provinces the desire of the people to secure the early replenishment of their exhausted supplies of food-grains, and the high price of wheat seed, led to the extensive sowing with the millets of land which after an ordinary season would have been sown with wheat. The prospects of the crop on this contracted area in Bombay and Berar also were not particularly good. In the Central Provinces, however, a fair crop was expected.

The provincial reports are summarised below:

The reports from Bombay were incomplete, sowings being still in progress at the date of report.

In the tracts which were affected by famine (the Deccan and Karnatak) the area under wheat was greatly below the average, jawar and other millets having been sown instead.

In Gujarat the area was about equal to the average, and in Sind, in consequence of an early and good overflow of the Indus, wheat had been largely sown over a largely extended area. The total area for the Presidency was estimated at 1,727,000 acres.

The rain at sowing time was favourable in Gujarat, but it was excessive in parts of Ahmadnagar and South Deccan, where sowings were retarded.

On the contracted area in the Deccan more rain was wanted, but elsewhere the crop was generally in fair to good condition.

In Berar, also, the area sown with wheat was greatly reduced, being smaller even than in the previous year, the earlier food-crops having been sown instead. Nor were prospects good, for the crop had not received sufficient moisture, and the yield was estimated at not more than half the average.

In the Central Provinces, too, the area sown with wheat, though larger than last year, when only half the average area was sown, was still much below the average, other food-grains having been sown on wheat lands. Prospects were, with a few exceptions, generally good.

In the North-Western Provinces and Oudh, the area sown to the 10th December was estimated as about equal to a full average, being a little over $4\frac{1}{2}$ million acres, conditions having been favourable at sowing time and since that period. Prospects were very good, but the winter rains were needed.

In the Panjab the conditions of the season were favourable, and the area sown with wheat was 7,175,000 acres, being 8 per cent. larger than that of the previous season.

A telegram in the *Times* of the 11th inst. summarises the later official estimates issued at Calcutta. The harvest in the Panjab and Sind is expected to yield 9 per cent. above the average; in the North-West Provinces and Bengal,

about the average; and in Bombay, the Central Provinces, and Haidarabad, much below the average.

CROPS IN RUSSIA.

The Central Statistical Committee have published in the *Viestnik Financov* an estimate of the produce of the principal cereals in the seventy-one governments and provinces of Russia in 1897. These yields, together with the estimates of production for the corresponding territories in 1896, are as follows :—

	1897. Quarters.	1896. Quarters.
Rye...	76,099,000	... 91,828,000
Wheat	42,388,000	... 51,344,000
Oats	60,161,000	... 81,778,000
Barley	28,549,000	.. 30,341,000

It would appear from these figures that the Russian wheat crop of 1897 was nearly 9,000,000 quarters below that of the preceding year, while the other three cereals show a total deficiency as compared with 1896 of 39,000,000 quarters.

THE ARGENTINE HARVEST OF 1897-98.

In his report to the Foreign Office on the trade of the Rosario district in 1897, Mr. Vice-Consul Mallet in speaking of the present harvest states that the wheat and linseed crops have been harvested, and threshing is well under way, with the result that the belief is confirmed that the present wheat crop will be an average one as regards quantity. The grain is said to be of fair quality. These remarks refer more especially to the crops of Santa Fé, the chief grain-producing district of the Republic. Cereal growing has also latterly been largely developed in the southern parts of the neighbouring province of Cordoba, and the crops of that district, which are chiefly shipped from Rosario, are said to be on the whole superior to those of the first-named province, and also abundant. The heavy rains experienced during the harvesting are believed, however, to have caused some damage to the grain generally.

It is exceedingly difficult to estimate the amount of wheat to be exported during 1898 on account of the diversity of opinion on this subject. Mr. Mallet states that information

from the same sources which enabled him to forecast the shipments from Rosario for 1897 leads him to believe that the export of wheat, after allowing for home consumption and seed, will be about 1,000,000 tons from the whole country, of which about 600,000 tons will be shipped from Rosario.

The linseed crop, having suffered more severely than wheat, does not promise to furnish a surplus for export exceeding the amount exported last year.

The weather up to the time of writing the report had been exceptionally favourable for maize, and since the area sown exceeds that of previous years, owing to the farmers who lost their wheat or linseed from drought and frost having immediately re-prepared their land and sown maize, the crop promises to be an unusual one, both as regards quantity and quality.

[*Foreign Office Report, Annual Series, No.* 2032. *Price* 1½d.]

THE AUSTRIAN HARVEST OF 1897.

The Ministry of Agriculture at Vienna has recently published estimates of the yield of the principal cereal crops in Austria in 1897. The figures, together with those for 1896, are given in the following table:—

Crop.	Area.		Production.	
	1897.	1896.	1897.	1896.
	Acres.	Acres.	Bushels.	Bushels.
Wheat	2,614,036	2,614,991	34,750,554	42,631,014
Rye	4,541,643	4,535,893	63,792,787	74,327,368
Barley	2,898,024	2,909,954	48,218,340	53,107,167
Oats	4,722,131	4,737,984	93,192,368	100,973,375
Maize	829,369	854,212	14,316,855	16,909,500

The total area under the above-named cereals in the past year was 15,605,000 acres, or 59·4 per cent. of the entire cultivated area of Austria. The cereal acreage, however, has been steadily declining for some years: in the year 1891 it was greater by upwards of 320,000 acres than it is at present. The yield of the five cereal crops mentioned above

during the past year was in each case below that of 1896, and also less than the average for the ten years 1887-96. The aggregate yield was about 33,678,000 bushels less than in the previous year.

With regard to wheat and rye, the acreage in 1897 was nearly the same as that in the previous year. The yield per acre of wheat was 13·3 bushels, or 3 bushels less than in 1896, and of rye 14 bushels, or 2·4 bushels less than in the preceding year; and the total production of these two food-grains declined by 18,415,000 bushels. The barley crop yielded 16·6 bushels against 18·2 bushels last year, whilst maize is estimated at 17·3 bushels against 19·8 bushels. The most largely cultivated cereal is oats, the area under this crop exceeding that of any other; the yield per acre was 19·7 bushels against 21·3 bushels in 1896.

CROP PROSPECTS IN FRANCE.

A report on the state of the crops of wheat and rye in France at the end of January last was published in the *Journal Officiel* of February 13.

It is stated as regards wheat that compared with the year 1897 there is an increased acreage in seventy departments (in five cases the increase exceeds 30 per cent.). The acreage is the same as in the previous year in thirteen departments, while in three others it is from 1 to 5 per cent. less, and in one department the decrease is as much as 10 per cent. The condition of the wheat crop was reported to be "very good" in thirteen departments, "good" in forty-four, "fairly good" in twenty-eight, and "passable" in the two remaining departments.

As regards the acreage under rye, compared with last year, there is an increase in twenty-six departments. In forty-six departments the acreage has not altered since last year, while it has decreased in thirteen departments (in one case by 40 per cent.). The condition of the growing crop was returned

as "very good" in nineteen departments, "good" in forty-seven, and "fairly good" in nineteen other departments. Rye is not grown at all in two departments of France.

FAILURE OF THE HARVEST IN SERVIA.

The Board have received information, through the Foreign Office, which indicates that, owing to the almost total failure of the Servian harvest in 1897, there has since been no export of cereals from that country; and that the Ministry of Finance issued a circular to the Customs on the 21st December last (old style), ordering the suspension of Customs dues on wheat and maize imported from Treaty as well as from non-Treaty States. The duties suspended are 75 centimes per 100 kilogrammes (4d. per cwt.) on maize, and 2 francs per 100 kilogrammes (10d. per cwt.) on wheat. The "obrt" (turn-over) taxes and other minor accessory Customs charges still remain in force.

The reserve stock of maize in the communal granaries was estimated at the end of January at 23 million kilogrammes (843,000 bushels); but no estimate could be given respecting the quantity in private hands. Importations of maize had begun from Bulgaria, and they were also probable from Roumania as soon as navigation opened on the Danube; but the eastern departments of Servia—viz., Negotin and Kraina—were fairly well supplied, and had so far had no occasion to purchase. The importation of wheat is not likely to be very considerable, as the peasantry, which comprises 90 per cent. of the population, prefer in times of scarcity to live on the cheaper maize, which also serves to fatten their swine.

Servia in average years is an exporting country, and usually exports several hundred thousand hundredweights of wheat and maize, chiefly to Hungary. The latter country exports its finer qualities and consumes Servia's inferior grain, which is admitted at a considerably reduced duty. It is estimated that Servia will have to import this year about 200,000 cwts. of wheat, and a similar quantity of maize.

THE SPANISH WHEAT HARVEST.

The Spanish Department of Customs has recently published a report upon the wheat harvest of that country during the years 1896 and 1897. The figures referring to these two years are compared with the quinquennium 1890-94, and serve as a basis for an estimate of the probable importation from abroad during the present year. According to this statement, it appears that the production of the Peninsula amounted to 8,704,000 qrs. in 1896, and to 10,743,000 qrs. in 1897, while the average crop for the period 1890-94 was 10,395,000 qrs., or 348,000 qrs. less than that of the past year. It is believed, however, that the results for the five years just referred to were under-estimated, and that the average production of the period was about 11,458,000 qrs. The superiority of the harvest of 1897 over that of 1896, and the fact that the importation from abroad in the cereal year ending 31st August, 1897, amounted to 917,000 qrs., make it probable that until the next harvest only the wheat required for the manufacture of flour for export will be imported. The average monthly importation to the end of August was 78,000 qrs., whilst since September, when the effects of the new crop began to be felt, the monthly import has fallen to 9,000 qrs., although the exports of flour have sensibly increased.

WHEAT HARVEST OF NEW SOUTH WALES.

The official estimate of the wheat harvest in New South Wales in 1897-98 places the actual area sown to wheat at 1,191,309 acres. Of this it is estimated that the area harvested for grain was 938,251 acres, giving a total yield of 9,745,000 bushels, or an average of about 10½ bushels per acre cut. The area cut for hay, viz., 253,058 acres, was very large. Of the total yield of grain, it is estimated that about 7,900,000 bushels will be required for consumption during 1898, and 1,500,000 bushels for seed, so that it would appear that not only has the colony produced sufficient for its own require-

ments, but that there is a small surplus. It is, however, considered questionable, taking the stocks on hand into consideration, whether the surplus available for export will be as large as appears at first sight, as there is a good deal of inferior wheat from the present harvest. The following statement shows the area and production of wheat during the last five years :—

Year.	Total area under Wheat.	Area cut for Grain.	Area cut for Hay.	Total yield of Wheat.
	Acres.	Acres.	Acres.	Bushels.
1893-94	695,685	593,810	101,875	6,502,715
1894-95	773,280	647,483	125,797	7,041,378
1895-96	769,298	596,684	172,614	5,195,312
1896-97	1,027,248	866,112	161,136	8,853,445
*1897-98	1,191,309	938,251	253,058	9,745,377

*Estimated.

CROPS AND LIVE STOCK IN THE CAPE COLONY.

The Board have received the Agricultural and Live Stock Returns of the Cape of Good Hope, which show the results of the harvest in the Cape Colony in the year 1896-97. The following tables give the yield of the principal crops in the colony proper, together with the numbers of live stock during the last three years.

A quantity of barley, rye, wheat, and oats were cut green.

Crops.	1896-97.	1895-96.	1894-95.
	Bushels.	Bushels.	Bushels.
Wheat	2,069,037	2,131,710	2,413,152
Barley	760,395	662,199	658,332
Oats	881,643	1,629,336	956,706
Rye	254,220	606,303	431,562
Maize	1,231,020	649,182	1,347,789
Potatoes	904,788	714,903	759,213
	lbs.	lbs.	lbs.
Tobacco	6,156,505	4,295,798	4,720,903
	No.	No.	No.
Horses	235,268	242,099	254,298
Cattle	1,231,147	1,228,469	1,303,061
Sheep	11,851,477	12,274,279	13,726,841
Pigs	153,240	154,076	169,205
Goats	4,397,535	4,155,418	4,314,337

About 63 per cent. of the goats are of the Angora breed, and 67 per cent. of the sheep are merinos. Wool is the principal pastoral product, and the yield in 1896-97 is given as 38 million pounds, and mohair as 8 millions. About 26,500 cwts. of butter were produced in the same year.

CROPS AND LIVE STOCK IN MANITOBA, 1897.

The results of the harvest of 1897 in Manitoba were not so satisfactory as had been anticipated from the preliminary estimates. The following figures give the final results for each of the principal crops, as estimated by the Department of Agriculture at Winnipeg, from the returns made on the 1st December last:—

Crop.	Area.	Yield.	
		Total.	Average per Acre.
	Acres.	Bushels.	Bushels.
Wheat - - - -	1,290,882	18,261,950	14·14
Oats - - - -	468,141	10,629,513	22·7
Barley - - - -	153,266	3,183,602	20·77
Potatoes - - -	13,576	2,033,298	149
Roots - - - -	6,130	1,220,070	199

The yield of flax was 247,836 bushels; of rye, 48,344 bushels; and of peas, 33,380 bushels.

The wheat crop was affected generally throughout the province by a blight known locally as "dead heads," and fields that gave the greatest promise yielded the most disappointing results. The range of yield varied from six to twenty-two bushels per acre. The season for harvesting and threshing was, however, exceedingly favourable, and although the average yield was only 14.14 bushels per acre, the price realized for the crop was so satisfactory that the province is reported to have entered upon a new era of prosperity. Oats and barley suffered from frost and dry weather, and there was a shortage of coarse grains for feed.

The number of live stock in Manitoba, according to the latest revised statistics, include 100,274 horses, 221,775 cattle, 36,680 sheep, and 74,944 pigs.

The number of cattle exported during the year 1897 amounted to 31,500, of which 15,000 were beef cattle. The number of hogs shipped from Manitoba alive or dressed was 12,500, and the number received by Winnipeg packers and butchers amounted to 25,000. It is estimated that, owing to the ever increasing demands in the North-West, every hog raised in the province will henceforward find a ready market in Winnipeg. The demand for poultry is larger than the home supply, which amounted last year to 47,540 turkeys, 20,000 geese and ducks, and 184,055 chickens. The quantity of creamery butter produced in the year was 987,179 lbs., and of cheese 987,007 lbs.

PARLIAMENTARY PUBLICATIONS.

Board of Trade—Alcoholic Beverages—[*H.C.* 408]. *Price* 8½*d.*

In a memorandum by Mr. Bateman introducing this "Statement showing the production and consumption of alcoholic beverages in the various countries of Europe and the United States," it is stated that almost the whole of the beer consumed in the United Kingdom (99.9 per cent.) is manufactured in this country. Of spirits, 82.2 per cent. is manufactured at home; while the whole of the wine, properly so-called, is imported. The consumption per head of the latter liquor is in this country very small, amounting to only about 0·4 of a gallon in the course of a year.

As regards beer, which is, from the point of view of the farmer in this country, the more interesting of the three classes of alcoholic beverages, it appears that in the United Kingdom, France, Germany, and the United States (the four countries possessing the most reliable statistics of these beverages), the consumption per head has been increasing since 1885; the increase being most marked in the United States. Of the four, the United Kingdom consumes the greatest quantity relatively to population (30 gallons per head per annum), followed by Germany with about 25 gallons; while the United States consume only about 12½, and France 5 gallons. Of other countries, however, Belgium ranks higher, with 43 gallons; while of individual German States, Bavaria consumes 50 gallons per capita. The total production of beer in the United Kingdom has increased from 991,807,000 gallons in 1882 to 1,238,120,000 gallons in 1896. The production in Germany is somewhat greater. It may be noted that there is a considerable export of beer, amounting

annually to nearly 20,000,000 gallons, from the United Kingdom.

Spirits may also be ranked as an agricultural product of this country, inasmuch as the materials of which it is generally made here are malted and unmalted barley and other cereals, as well as foreign products (maize, rice, sugar, &c.); while sugar and starch producing vegetables, such as beet-root and potatoes, are also used. The consumption per head is greatest in Belgium, where it is a little over 2 gallons per annum (proof spirit); France, Germany, and Holland consume a nearly identical quantity, amounting on the average to nearly 2 gallons per head. The United Kingdom and the United States, on the other hand, average just one gallon per head. The consumption of spirits in this country is almost stationary; but there is perhaps a slight tendency to increase. The United States exhibit a decrease since 1885. The total production of spirits amounted, in 1896, to 52,834,000 gallons in the United Kingdom; the rise in the production has been considerable since 1882, when the production was under 40,000,000 gallons.

The net revenue to the State from the taxation of alcohol amounted in 1896-7 to £32,534,000, of which the Customs contributed 17 per cent., and the Excise 83 per cent. The Excise was made up of receipts from beer (£10,901,000) and spirits (£16,013,000); from the Customs there were derived £16,000 from beer, £1,296,000 from wine, and £4,318,000 from spirits. The total income from alcohol formed, in the year named, 36 per cent. of the whole net revenue of the State. It may be added that the proportion of receipts from Excise shows a tendency to increase, as compared with the receipts from Customs.

The Annual Local Taxation Returns (England) for the Financial Year 1895-96. *Part II.* [H.C.—373.] *Price* 6½*d.*

This publication of the Local Government Board contains an abstract of the accounts of county councils (other than the London County Council) and joint committees of such councils, as well as the accounts of pauper lunatic asylums,

other than those belonging to the County and City of London.

It appears from the Return that the annual value, according to the county rate basis, of the property liable to be rated to the rate for general county purposes in England and Wales excluding the County of London, was £96,272,300.

The special county purposes for which rates were levied, so far as the purposes were shown by the returns, included police, Contagious Diseases (Animals) Act, Bridges, Weights and Measures Act, Lunatic Asylums, Sea Fisheries, Food and Drugs Act, and Technical and Intermediate Education, whilst in many cases these purposes were provided for out of the rates levied for general county purposes.

The highest rates for general and special county purposes in the administrative counties were 11d. and 5½d. in the £, and the lowest 1⅛d. and $\frac{1}{20}$d. in the £ respectively. In the Scilly Islands the rates for general purposes amounted to 1s. 2d. in the £ in one parish and to 11d. in four parishes. All the counties were rated for general county purposes in 1895-6, but in sixteen counties no rates for special county purposes were raised during the year.

The total receipts of the county councils, the council of the Scilly Islands, and the joint committees for Lincolnshire, Suffolk, Sussex, and Yorkshire, excluding loans and sums received for re-investment in respect of the police pension funds, amounted to £6,856,676 during the year.

The increase in the total receipts, as compared with 1894-95, was £144,212, of which £29,700 was in rates, £32,200 in receipts from the local taxation account, and £58,500 in receipts from other local authorities.

The expenditure of the councils during the year (excluding that defrayed out of loans), namely £6,817,052, was almost the same in amount as the receipts from sources other than loans. There was a small increase in the total expenditure in 1895-96 as compared with that of the preceding year, but there appears to be no special alteration in particular items of expenditure to which attention need be directed.

The expenditure of the county councils under the Conta-

gious Diseases (Animals) Act, 1894, was £21,617, as compared with £23,388 in 1894-95.

Weights and Measures. Report by the Board of Trade on their Proceedings and Business under the Weights and Measures Acts. [H.C.—392.] *Price* 2½*d.*

This report is made under the 33rd Section of the Weights and Measures Act, 1878, and contains, *inter alia*, a list of districts of local authorities for which local standards were verified or re-verified by the Board of Trade, or locally compared, during the twelve months ending August 4th, 1897, and the names and districts of inspectors authorised during the same period to adjust weights and measures, appointed by local authorities. An appendix gives the equivalents of metric in terms of imperial weights and measures.

Agricultural Rates Act, 1896. *Copy of Order of the Local Government Board further amending their order of 28th July,* 1896, *making regulations for the purposes of the Act. H. C.* 1. *Price* 1*d.*

This Order directs that in every parish in the Metropolis in which there is any agricultural land any new or supplemental valuation list made after the 31st March, 1898, shall be made out in a form shown in the schedule to the Order.

Board of Trade. Foreign Import Duties. [H.C.—376.] *Price* 1*s.* 9*d.*

This publication is a new edition of the Return relating to Foreign Import Duties [401 of Session 1893], embodying the various alterations affecting duties on goods imported from this country during the last four years; and details of the rates of import duties levied in European countries and the United States upon the produce and manufactures of the United Kingdom, so far as notified to the Board of Trade at the end of 1897.

Ireland. Sixth Report of the Congested Districts Board for Ireland, of Proceedings under the Congested Districts Board (Ireland) Acts, 1891-1896 (54 *and* 55 *Vict., Ch.* 48, *Section* 41.) [C.—8,622.] *Price* 4*d.*

This report, recently published, refers to the proceedings and expenditure of the Congested Districts Board for Ireland for the financial year ended on the 31st of March, 1897.

It contains detailed information on agriculture generally, as well as on sea fisheries, local industries, and other matters. Some account will be found in another part of the Journal of the experiments on potato cultivation (p. 505.)

Crofter Colonisation. Eighth Report of Her Majesty's Commissioners appointed to carry out a scheme of Colonisation in the Dominion of Canada of Crofters and Cottars from the Western Highlands and Islands of Scotland. [C.—8576.] *Price* 1½*d.*

This report contains information as to the present condition of the two settlements, in Manitoba and the North-West Territories, which were first established in 1888 and 1889. From this it appears that there are 54 homesteads under cultivation in the Killarney Settlement in Manitoba, which numbers about 160 persons. The area under cultivation in 1896 was 2,828 acres, and the additional area broken and under summer fallow was 913 acres, or a total of 3,741 acres, as compared with 3,604 acres in 1895. Dividing this area among the 30 families forming the settlement, the average is about 120 acres per family.

The Saltcoats settlement, in the North-West Territories, contained about 90 persons. They had 35 acres under cultivation.

PRICES OF LIVE STOCK

AS RETURNED UNDER THE WEIGHING OF CATTLE ACT.

The returns of prices obtained under the Markets and Fairs (Weighing of Cattle) Act, 1891, are now complete for the year 1897. Summaries of the statements received by the Board of Agriculture, showing the results both for the last quarter of the year and for the whole twelve months, are given accordingly in the present number of this Journal. For convenience of reference with the quarterly statements given in the last three numbers, the data for the fourth quarter of 1897, showing the animals weighed and the prices where fully returned, are supplied in the tables appended on page 543. It need only be remarked on the details for the quarter that the number of cattle and swine weighed in the last three months of 1897 shows little variation from the same period of 1896, while the number of sheep weighed was greater than before. For the ten markets selected as showing the most comparable record of values, the average prices of cattle per cwt. ranged from a minimum of 24s. 2d. at Aberdeen for inferior stock to 38s. 2d. for prime cattle in London in the quarter, while the current prices both of second and of first quality fat stock were, with scarcely any exception, slightly above those reported in the last three months of the preceding year. More fat cattle than in the previous quarter were returned as sold by actual live weight, and considerably more store cattle were weighed at the only two places, Edinburgh and Shrewsbury, from which transactions of this class were reported.

Turning to the more generally interesting figures for the complete year 1897, the returns may be usefully compared with those for the four earlier years for which statistics of this nature have been collected from the nineteen places scheduled

for the purpose under the Act of 1891. From the following table giving in one view the numbers entering, weighed, and priced in each of the five years 1893-1897 inclusive, it is apparent that the total number of cattle shown in these markets had declined up to the end of 1896. They were again very slightly more numerous in 1897; but the total of that year was considerably less than in 1893. Sheep were less numerous by nearly three-quarters of a million than in 1893, while the swine accounted for have fluctuated in number from year to year. A distinct increase is nevertheless shown in the number of cattle and sheep weighed alive in the last over the earlier year, as also in those for which prices have been obtained and returned, and in those for which the prices rendered were given with sufficient distinction of grades to render the statistics valuable for comparison.

In both sheep and swine the cases of weighing are still relatively very few in number, but as many as 111,700 cattle out of 1,115,000, or practically 10 per cent., were passed over the weighbridges of the 19 selected places in 1897, against only 92,000 out of 1,219,000 in 1893, while the complete price records were furnished for 78,000 cattle in the later, as compared with 57,000 in the earlier year. These recorded transactions furnish, it may be pointed out, a larger number of actual price records respecting the current prices of live stock than have, in any other form, been previously available. The complete table is as follows:—

Animals.	1897.	1896.	1895.	1894.	1893.
CATTLE:	No.	No.	No.	No.	No.
Entering markets -	1,115,183	1,100,014	1,186,149	1,203,533	1,219,208
Weighed - - -	111,767	109,184	100,033	96,344	92,492
Prices returned - -	100,371	99,537	88,403	84,593	84,403
Prices returned with quality distinguished	78,329	75,014	64,072	58,559	57,323
SHEEP:					
Entering markets -	4,194,310	4,309,943	4,330,256	4,649,277	4,854,732
Weighed - - -	41,969	41,685	34,886	39,210	38,177
Prices returned with quality distinguished	36,692	35,048	23,577	26,072	28,180
SWINE:					
Entering markets -	211,613	232,344	233,189	139,187	191,376
Weighed - - -	2,333	4,585	2,803	2,498	1,450
Prices returned - -	1,368	1,686	1,226	523	401
Prices returned with quality distinguished	1,368	1,686	17	56	6

The practice of weighing cattle alive during, before, or after sale has been from the first much more resorted to in Scotland than in England. Comparing the position of matters in these two countries in the last two years, the English proportion of weighed cattle represents not much over 3½ per cent. of those returned as shown in the markets or marts, while the Scotch proportion exceeds 30 per cent. For the two last years the distinction stands thus :—

Cattle at Scheduled Places.	England.		Scotland.	
	1897.	1896.	1897.	1896.
	No.	No.	No.	No.
Number entering markets - -	849,199	827,869	265,984	272,145
Number returned as weighed- -	31,192	29,250	80,575	79,934
Number for which prices and quality were distinguished.	21,285	20,881	57,044	54,133

A reference to the general table given on page 545, showing the number of animals weighed in the past year in each of the scheduled places, indicates that weighing is being adopted in very different degrees in different parts of England itself. Thus in the Metropolitan Market of London over 17 per cent. of the cattle shown are returned as weighed on the Corporation weighbridge, and nearly 14 per cent. are weighed at Shrewsbury, while, on the other hand, at the five largest scheduled markets, viz., Salford, Norwich, Newcastle, Wakefield, and York, where some 479,000 head of cattle were shown last year, the number weighed in the twelve months hardly exceeded 4,000 head.

Even in Scotland the extent to which weighing is resorted to differs considerably so far as the reports received from the several markets or auction marts go. Dundee appears the centre where the practice is most in favour, nearly 74 per cent. of the cattle shown being recorded as weighed. Aberdeen and Edinburgh, with 41 and 38 per cent. weighed, are considerably below this ratio. The weighing records of Perth with 19 per cent. and Glasgow with only 11 per cent. accounted for as weighed are the least complete of the Scottish statistics.

Only one per cent. of the sheep shown in the nineteen scheduled places would appear to have been weighed in 1897, and the returns mainly come from three English markets—London, Liverpool, and Leeds—and three Scotch centres, viz., Dundee, Perth, and Aberdeen. More than half of the total number of nearly 42,000 sheep returned as weighed in the twelve months in Great Britain were reported from the last-named city alone. The cases where swine are returned as weighed alive are also very few, and very little over one per cent. of the swine shown. In England more, it appears, of these animals were weighed than in Scotland, Newcastle and Leeds giving the largest return.

In all three descriptions of live stock there are differences, which it is difficult to explain, in the extent to which the market authorities or auctioneers have succeeded in discharging the new statutory obligations imposed by the Act of 1891, which required them to ascertain the current prices of the weighed animals. Thus in Leeds, where 1,126 head of cattle and 1,800 head of sheep were reported as weighed in the year, prices were given for these totals; while at the same market, out of 727 swine weighed, in no single instance has a price been furnished. Again, it is remarkable and somewhat disappointing to find that at the Metropolitan Cattle Market, where much the largest total of cattle and of sheep in England was weighed, prices were obtained for only 5,539 cattle out of 13,690 weighed, or 40 per cent., and for only 10 sheep out of 4,557—a result which must be regarded as far from satisfactory. No difficulty of like nature appears to have been encountered in 1897 at Liverpool, where the whole number of animals weighed had their prices supplied by the market authority. Of the Scottish returns there remains some ground for complaint in this particular in those from two auction marts in Edinburgh and Perth, where a difficulty, not encountered elsewhere, is reported in distinguishing the quality of the stock sold.

The calculated values of the fat cattle sold in 1897 at the ten places whence the series of comparative returns are most complete, with the number of the actual transactions on

which each average price is based per stone and per cwt., are shown below :—

PLACES.	INFERIOR. (3rd Quality.)			GOOD. (2nd Quality.)			PRIME. (1st Quality.)		
	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.
		s. d.	s. d.		s. d.	s. d.		s. d.	s. d.
Leeds	59	3 5½	27 8	445	3 9½	30 4	622	4 0½	32 4
Liverpool	141	3 2¾	25 10	1,130	3 9	30 0	4,495	4 1	32 8
London	76	3 6½	28 4	1,689	4 2½	33 8	3,774	4 10½	38 10
Newcastle	46	3 4¾	27 2	105	3 10	30 8	1,848	4 6¼	36 2
Shrewsbury	85	3 2	25 4	274	3 9¾	30 6	120	4 3¾	34 6
Aberdeen	4,262	3 1	24 8	11,420	4 1½	33 0	8,834	4 6	36 0
Dundee	581	3 5¼	27 6	5,951	4 0¾	32 6	4,651	4 4¾	35 2
Edinburgh	—	—	—	9,763	4 2¾	33 10	1,772	4 5¼	35 8
Glasgow	1,241	3 10	30 8	2,096	4 1¾	32 10	2,275	4 5¼	35 10
Perth	464	3 11	31 4	1,494	4 2¾	33 10	1,216	4 5¾	35 10

So far as these figures represent the prices of the year it will be observed that the quotations supplied fluctuate in the inferior grade from 24s. 8d. per cwt. to 31s. 4d. Only Perth and Glasgow, however, quote prices of over 30s. per cwt. as representing the average of the transactions in the lowest of the three grades of quality. In the group of cattle entered as of second quality the range is closer, and the basis of number much more satisfactory and extensive, a price of 30s. per cwt. at Liverpool comparing with one of 33s. 8d. in London, and with 33s. 10d. in Edinburgh and Perth.

In the group of prime cattle the average liveweight prices of the complete year 1897 range from 32s. 4d. per cwt. at Leeds to 38s. 10d. in London; and it may be remarked that of 18,700 cattle so classed in the five Scotch towns the range of quotations comes singularly close, differing only between

PLACES.	INFERIOR or Third Quality.		GOOD or Second Quality.		PRIME or First Quality.	
	1897.	1896.	1897.	1896.	1897.	1896.
	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.	Per Cwt. s. d.
Leeds	27 8	26 10	30 4	29 2	32 4	32 2
Liverpool	25 10	—	30 0	28 4	32 8	32 4
London	28 4	27 8	33 8	32 8	38 10	37 0
Newcastle	27 2	26 0	30 8	30 4	36 2	33 10
Shrewsbury	25 4	25 0	30 6	30 0	34 6	34 4
Aberdeen	24 8	23 8	33 0	31 6	36 0	34 10
Dundee	27 6	25 2	32 6	31 4	35 2	33 6
Edinburgh	—	27 2	33 10	32 6	35 8	33 4
Glasgow	30 8	31 6	32 10	31 4	35 10	35 0
Perth	31 4	29 10	33 10	31 10	35 10	33 10

market and market from 35s. 2d. to 36s. per cwt. on the average of the year.

Comparing the prices of 1897 and 1896 in the customary form, the liveweight returns above quoted show that, with only a single exception in the case of the prices of cattle of inferior quality at Glasgow, prices of meat per cwt. have ranged in every grade of cattle higher in the year 1897 than on the average of the preceding twelvemonth.

It is a distinctly encouraging feature to observe the very considerable increase in the number of fat cattle sold by actual liveweight, that is, at an agreed on rate per cwt., the total reaching 5,345, against 3,593 in 1896. These were sold at seven places during the year 1897, Dundee and Edinburgh supplying much the largest proportion of such sales. To these transactions should be added also the sale by liveweight of 796 store cattle at Edinburgh, a figure which compares with 437 stores sold by live weight in 1896. The total number of store cattle which were in 1897 returned as having passed over the weighbridge, including those last mentioned, reached 5,297, against 3,266. These sales were most numerous at Shrewsbury. The increase may indicate an improvement in another direction. The calculated price of these stores ranged from 21s. per cwt. for some inferior stock at Edinburgh to 35s. 4d. for prime stores at Shrewsbury.

The customary tables are appended.

I.—Total number of animals entering, weighed, and priced at the nineteen Scheduled Places in Great Britain in the Fourth Quarter of 1897 :—

Animals.	4th Quarter, 1897.	4th Quarter, 1896.	4th Quarter, 1895.
CATTLE :	No.	No.	No.
Entering markets - - -	350,807	342,981	345,630
Weighed - - - - -	29,386	29,664	26,879
Prices returned - - - -	25,332	26,146	23,342
Prices returned with quality distinguished.	20,625	20,504	17,443
SHEEP :			
Entering markets - - -	949,744	1,010,925	1,043,239
Weighed - - - - -	7,632	7,411	6,527
Prices returned with quality distinguished.	6,100	6,266	5,367
SWINE :			
Entering markets - - -	93,750	65,498	68,611
Weighed - - - - -	831	865	808
Prices returned - - - -	513	255	240
Prices returned with quality distinguished.	513	255	11

II.—Prices of fat cattle at the undermentioned ten places in the Fourth Quarter of 1897 :—

Places.	Inferior (3rd Quality).			Good (2nd Quality).			Prime (1st Quality).		
	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.	Number.	Price per Stone.	Price per Cwt.
		s. d.	*s. d.*		*s. d.*	*s. d.*		*s. d.*	*s. d.*
Leeds - -	25	3 5	27 4	223	3 10¾	31 2	191	4 0½	32 4
Liverpool -	18	3 1½	25 0	277	3 6¼	28 2	1,965	4 0	32 0
London - -	9	3 0½	24 4	572	4 0¼	32 2	816	4 9¼	38 2
Newcastle -	14	3 5¾	27 10	44	3 10¼	30 10	97	4 3½	34 4
Shrewsbury -	30	3 1¾	25 2	42	3 11	31 4	12	4 3¼	34 2
Aberdeen -	862	3 0¼	24 2	2,511	4 1¾	33 2	2,159	4 6¼	36 2
Dundee - -	155	3 4½	27 0	1,290	4 0¼	32 2	1,085	4 5	35 4
Edinburgh -	...	...	...	2,543	4 0¾	32 6	777	4 5¾	35 10
Glasgow -	571	3 7¾	29 2	554	4 0¼	32 2	603	4 4¾	35 2
Perth - -	97	3 9½	30 4	346	4 1¼	32 10	231	4 5½	35 8

Cattle, Sheep, and Swine, entering the Markets and Marts of the undermentioned Places, with the Number Weighed, as received from the Market Authorities in the **Fourth Quarter** of 1897, under the Markets and Fairs (Weighing of Cattle) Act, 1891 (54 & 55 Vict. c. 70).

PLACES.	Cattle.			Sheep.			Swine.		
	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.
ENGLAND.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
Ashford	4,177	18	—	30,266	—	—	3,967	1	—
Birmingham	5,554	4	4	15,172	—	—	51,016	—	—
Bristol	17,786	24	24	20,020	—	—	—	—	—
Leicester	15,436	312	222	25,225	6	—	1,438	16	12
Leeds	7,406	439	439	25,085	29	29	488	93	—
Lincoln	2,462	17	7	16,583	—	—	1,563	—	—
Liverpool	25,742	2,260	2,260	78,485	416	416	—	—	—
London	24,915	4,382	1,397	109,477	1,504	10	1,465	—	—
Newcastle-upon-Tyne	28,127	155	155	79,486	—	—	12,666	408	408
Norwich	41,009	29	29	27,862	—	—	5,581	—	—
Salford	37,454	303	115	97,502	—	—	577	214	—
Shrewsbury	11,054	1,586	1,552	18,451	—	—	2,216	—	—
Wakefield	26,860	317	—	42,171	—	—	—	—	—
York	29,265	21	21	73,939	—	—	395	—	—
SCOTLAND.									
Aberdeen	17,288	5,532	5,532	36,150	3,549	3,549	4,622	—	—
Dundee	3,163	2,569	2,530	5,455	779	779	594	6	—
Edinburgh	20,632	7,305	*3,936	54,247	—	—	1,824	—	—
Glasgow	17,179	2,058	1,728	108,148	20	8	1,914	—	—
Perth	15,298	2,055	*674	86,020	1,329	1,309	3,424	93	93
TOTAL for ENGLAND	277,247	9,867	6,225	659,724	1,955	455	81,372	732	420
TOTAL for SCOTLAND	73,560	19,519	*14,400	290,020	5,677	5,645	12,378	99	93
Total	350,807	29,386	*20,625	949,744	7,632	6,100	93,750	831	513

* Prices for 3,326 cattle in addition to the above were quoted from Edinburgh, and for 1,381 cattle from Perth, but without distinguishing the quality.

Cattle, Sheep, and Swine entering the Markets and Marts of the undermentioned Places, with the Number Weighed, as received from the Market Authorities under the Markets and Fairs (Weighing of Cattle) Act, 1891 (54 and 55 Vict. c. 70) in the **Year** 1897.

Places.	Cattle.			Sheep.			Swine.		
	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.	Total Number entering the Markets or Marts.	Number Weighed.	Number Weigh'd for which Prices were given.
England.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
Ashford	13,678	183	—	107,444	35	—	12,937	1	—
Birmingham	25,700	8	8	87,083	—	—	68,655	—	—
Bristol	54,794	86	86	116,185	—	—	33	—	—
Leicester	58,459	999	769	85,407	46	33	5,006	45	37
Leeds	28,523	1,126	1,126	122,400	1,800	1,800	4,004	727	—
Lincoln	8,192	61	47	72,099	—	—	10,462	—	—
Liverpool	63,452	5,766	5,766	343,033	2,316	2,316	—	—	—
London	79,260	13,690	5,539	599,777	4,557	10	4,620	9	—
Newcastle-upon-Tyne	99,258	1,999	1,999	342,049	26	26	31,433	971	971
Norwich	99,795	344	329	207,932	220	220	18,507	—	—
Salford	121,990	1,058	805	582,238	—	—	1,590	214	—
Shrewsbury	37,701	5,258	4,752	68,333	100	—	6,090	—	—
Wakefield	83,116	552	—	186,875	429	—	166	—	—
York	75,281	62	59	159,831	30	30	1,510	—	—
Scotland.									
Aberdeen	60,266	24,516	24,516	196,310	21,262	21,262	18,268	—	—
Dundee	15,649	11,524	11,290	22,636	3,785	3,785	1,866	8	2
Edinburgh	70,200	26,568	*12,452	226,181	—	—	5,648	—	—
Glasgow	59,909	6,598	5,612	402,980	313	180	8,465	—	—
Perth	59,960	11,369	*3,174	265,517	7,050	7,030	12,353	358	358
Total for England	849,199	31,192	21,285	3,080,686	9,559	4,435	165,013	1,967	1,008
Total for Scotland	265,984	80,575	*57,044	1,113,624	32,410	32,257	46,600	366	360
Total	1,115,183	111,767	*78,329	4,194,310	41,969	36,692	211,613	2,333	1,368

* Prices for 13,847 cattle in addition to the above were quoted from Edinburgh, and for 8,195 cattle from Perth, but without distinguishing the quality.

PRICES OF MEAT, CORN, AND DAIRY PRODUCE.

AVERAGE PRICES of DEAD MEAT, per Stone of 8 lbs., at the LONDON CENTRAL MEAT MARKET, during the fourth Quarter of 1897, and during the Months of November and December, 1897, and January, 1898.

(Compiled from the prices quoted weekly in the "Meat Trades Journal.")

DESCRIPTION.	4TH QUARTER 1897.	NOVEMBER, 1897.	DECEMBER, 1897.	JANUARY, 1898.
BEEF :—	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*
Scotch, short sides	4 1 to 4 4	4 1 to 4 4	4 0 to 4 4	3 11 to 4 2
,, long sides	3 9 ,, 3 11	3 9 ,, 3 11	3 8 ,, 3 11	3 7 ,, 3 9
English	3 6 ,, 3 8	3 6 ,, 3 8	3 6 ,, 3 8	3 6 ,, 3 8
Cows and Bulls	2 0 ,, 2 10	2 2 ,, 2 10	1 8 ,, 2 10	1 10 ,, 2 9
American, Birkenhead killed	3 1 ,, 3 5	3 1 ,, 3 5	3 1 ,, 3 5	3 0 ,, 3 4
,, Deptford killed	3 1 ,, 3 5	3 1 ,, 3 5	3 3 ,, 3 6	3 0 ,, 3 4
Argentine ,, ,,	2 8 ,, 3 0	2 8 ,, 3 0	2 10 ,, 3 1	2 7 ,, 2 10
American Refrig. hind-quarters	3 4 ,, 3 7	3 5 ,, 3 8	3 5 ,, 3 8	3 2 ,, 3 5
,, ,, fore-quarters	2 1 ,, 2 4	2 3 ,, 2 5	2 2 ,, 2 4	2 4 ,, 2 5
Australian, Frozen hind-quarters	1 7 ,, 1 10	1 5 ,, 1 8	1 10 ,, 2 2	2 0 ,, 2 4
,, ,, fore-quarters	1 3 ,, 1 5	1 1 ,, 1 4	1 5 ,, 1 7	1 6 ,, 1 7
MUTTON :—				
Scotch, Prime	4 2 ,, 4 7	4 2 ,, 4 7	4 0 ,, 4 5	4 2 ,, 4 8
English, Prime	3 11 ,, 4 5	3 11 ,, 4 4	3 10 ,, 4 5	4 0 ,, 4 7
Ewes	2 9 ,, 3 2	2 9 ,, 3 1	2 10 ,, 3 2	2 9 ,, 3 4
Continental	3 3 ,, 3 7	3 2 ,, 3 6	3 3 ,, 3 8	3 7 ,, 4 0
River Plate, Town killed	3 0 ,, 3 3	3 0 ,, 3 3	3 1 ,, 3 3	3 2 ,, 3 5
New Zealand, Frozen	1 10 ,, 2 4	1 10 ,, 2 3	1 9 ,, 2 4	1 9 ,, 2 4
Australian, Frozen	1 7 ,, 1 8	1 6 ,, 1 7	1 8 ,, 1 9	1 8 ,, 1 9
River Plate, Frozen	1 7 ,, 1 8	1 6 ,, 1 8	1 8 ,, 1 9	1 7 ,, 1 9
LAMB :—				
English	— —	— —	— —	— —
New Zealand, Frozen	2 9 ,, 3 1	2 8 ,, 3 1	3 6 ,, 4 0	3 9 ,, 4 3
VEAL :—				
English	4 0 ,, 4 6	4 1 ,, 4 6	3 11 ,, 4 6	4 0 ,, 4 4
Foreign	3 6 ,, 3 11	3 7 ,, 4 0	3 7 ,, 3 11	3 6 ,, 3 10
PORK :—				
English, best	4 2 ,, 4 6	4 2 ,, 4 6	4 1 ,, 4 5	4 0 ,, 4 4
,, secondary / Foreign	3 6 ,, 4 0	3 6 ,, 4 1	3 4 ,, 3 10	3 4 ,, 3 10

AVERAGE WHOLESALE PRICES of CATTLE and SHEEP, per Stone of 8 lbs., sinking the offal, at the METROPOLITAN CATTLE MARKET, during each Quarter of 1897, with the Mean Prices for the Year.

PERIOD.	CATTLE.			SHEEP.		
	Inferior.	Second.	First.	Inferior.	Second.	First.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
1st Quarter, 1897	2 5	3 11	4 6	3 9	5 1	5 9
2nd Quarter ,,	2 5	4 0	4 7	3 10	4 11	5 8
3rd Quarter ,,	2 4	4 0	4 7	3 7	5 0	5 8
4th Quarter ,,	2 4	3 10	4 5	3 4	4 11	5 7
The Year - -	2 5	3 11	4 6	3 8	5 0	5 8

AVERAGE WHOLESALE PRICES OF BEEF and MUTTON, per Stone of 8 lbs., by the Carcase, at LIVERPOOL and GLASGOW, during each Quarter of 1897, with the Mean Prices for the Year.

PERIOD.	LIVERPOOL.*		GLASGOW.†	
	BEEF.	MUTTON.	BEEF.	MUTTON.
	s. d. s. d.	*s. d. s. d.*	*s. d. s. d.*	*s. d. s. d.*
1st Quarter, 1897	2 8 to 3 6	3 4 to 5 2	2 8 to 4 0	4 0 to 5 0
2nd Quarter ,,	2 8 ,, 3 6	2 8 ,, 5 4	2 8 ,, 4 0	3 4 ,, 4 10
3rd Quarter ,,	2 8 ,, 3 8	3 4 ,, 4 8	2 4 ,, 3 8	3 4 ,, 4 4
4th Quarter ,,	2 0 ,, 3 5	2 10 ,, 4 10	2 4 ,, 3 8	3 0 ,, 4 6
The Year - -	2 6 ,, 3 6	3 0 ,, 5 0	2 6 ,, 3 10	3 5 ,, 4 8

* Compiled from information furnished by the Medical Officer of Health, Liverpool. The prices quoted are for Carcases of Animals *slaughtered at the Liverpool Abattoir*, and do not apply to Imported Meat.

† Compiled from information furnished by the Principal of the Veterinary College, Glasgow.

BERLIN MARKET.

AVERAGE PRICES of CATTLE and SHEEP (First Quality Dead Weight) in the BERLIN CATTLE MARKET in the undermentioned Months of 1897 and 1898, together with the Mean Prices for 1897.

MONTHS.	CATTLE. Per Cwt.	SHEEP. Per Cwt.
	s. d.	*s. d.*
December, 1897 - - -	61 1 to 65 11	53 9 to 57 3
Mean of the Year - -	59 8 ,, 63 11	52 9 ,, 55 8
January, 1898 - - -	60 4 ,, 64 2	52 5 ,, 56 3
February - - -	58 10 ,, 63 5	53 9 ,, 57 0

NOTE.—The above prices have been compiled from the weekly returns published in the *Deutsche Landwirthschaftliche Presse.*

PARIS MARKET.

AVERAGE PRICES of CATTLE, SHEEP, and SWINE (Medium Quality) in the PARIS CATTLE MARKET in the undermentioned Months of 1897 and 1898, together with the Mean Prices for the Year 1897.

MONTHS.	OXEN. Per Cwt.	CALVES. Per Cwt.	SHEEP. Per Cwt.	PIGS. Per Cwt.
	LIVE WEIGHT.			
	s. d.	*s. d.*	*s. d.*	*s. d.*
December, 1897 - -	28 10	36 6	37 11	30 6
Mean of the Year -	30 9	38 1	39 5	32 10
January, 1898 - -	29 9	38 3	37 0	33 4
February - -	27 3	40 8	37 1	33 10
	DEAD WEIGHT.			
	s. d.	*s. d.*	*s. d.*	*s. d.*
December, 1897 - -	52 0	66 10	66 2	45 0
Mean of the Year -	54 5	70 2	68 1	46 6
January, 1898 - -	50 1	70 1	66 10	46 3
February - -	50 11	72 6	68 10	48 3

NOTE.—The above prices have been compiled from the weekly returns published in the *Journal d'Agriculture Pratique.*

CHICAGO.

PRICES of CATTLE at CHICAGO per Cwt. (Live Weight) in the under-mentioned Months of 1897 and 1898, together with the mean Prices for the Year 1897.

Months.	Good Dressed Beef and Shipping Steers.	Export Cattle.	Extra Prime Cattle.
	s. d. to *s. d.*	*s. d.* to *s. d.*	*s. d.* to *s. d.*
December, 1897	19 7 to 23 10	19 4 to 24 9	23 10 to 26 4
Mean of the year - -	19 5 ,, 23 10	20 2 ,, 24 7	24 0 ,, 25 11
January. 1898 -	20 1 ,, 24 3	20 1 ,, 24 6	24 6 ,, 26 2
February - -	19 10 ,, 25 2	20 4 ,, 25 8	25 2 ,, 26 10

Compiled from the Live Stock Reports issued by Messrs. Clay, Robinson, and Co., of the Union Stock Yards, Chicago, Illinois.

AVERAGE VALUES, per Cwt., of various Kinds of DEAD MEAT Imported into the United Kingdom from FOREIGN COUNTRIES and BRITISH POSSESSIONS in each Quarter of 1897, with the Average Values for the Year.

(*Computed from the Trade and Navigation Accounts.*)

PERIOD.	BEEF.		MUTTON.	PORK.		BACON.	HAMS.
	Fresh.	Salted.	Fresh.	Fresh.	Salted.		
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
1st Quarter, 1897 -	39 4	25 9	27 4	44 11	23 4	33 5	41 9
2nd Quarter ,, -	40 1	23 10	32 0	43 11	20 10	35 11	43 5
3rd Quarter ,, -	37 2	24 7	30 9	43 3	20 3	35 10	43 5
4th Quarter ,, -	37 7	24 9	30 5	43 7	21 2	36 9	41 2
THE YEAR - -	38 5	24 8	30 3	44 0	21 5	35 5	42 8

AVERAGE PRICES of **British Corn** per Quarter of 8 imperial bushels,* computed from the Weekly Averages of Corn Returns from the 196 Returning Markets of ENGLAND AND WALES, pursuant to the Corn Returns Act, 1882, together with the QUANTITIES returned as sold at such Markets, in the under-noted periods of the Years 1897, 1896, and 1895.

QUARTER ENDED	PRICES.			QUANTITIES.		
	1897.	1896.	1895.	1897.	1896.	1895.
Wheat.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day	29 7	25 8	20 1	619,679	448,047	652,874
Midsummer	27 6	25 2	23 1	619,618	384,559	496,615
Michaelmas	30 4	23 7	23 11	635,698	505,988	361,223
Christmas	33 3	30 5	25 1	881,566	772,427	417,671
Barley.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day	24 0	22 5	21 6	784,713	955,902	1,035,588
Midsummer	21 4	21 4	20 3	78,488	92,739	79,936
Michaelmas	21 6	21 0	21 3	118,875	165,722	141,985
Christmas	27 0	27 1	24 10	2,275,111	2,177,499	2,169,067
Oats.						
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
Lady Day	16 4	13 9	13 9	194,193	259,565	250,838
Midsummer	17 3	14 3	15 2	79,707	99,672	111,424
Michaelmas	17 10	14 6	15 1	75,824	94,383	88,312
Christmas	16 5	16 7	13 10	200,710	201,533	215,365

* Section 8 of the Corn Returns Act, 1882, provides that where returns of purchases of British Corn are made to the local inspector of Corn Returns in any other measure than the imperial bushel or by weight or by a weighed measure, that officer shall convert such returns into the imperial bushel, and in the case of weight or weighed measure the conversion is to be made at the rate of 60 imperial pounds for every bushel of wheat, 50 imperial pounds for every bushel of barley, and 39 imperial pounds for every bushel of oats.

AVERAGE PRICES of **British Corn** per Quarter of 8 imperial bushels, computed from the Returns received under the Corn Returns Act, 1882, in each of the under-mentioned Weeks in 1898, and in the corresponding Weeks in 1897 and 1896.

Weeks ended *(in 1898)*.	Wheat.			Barley.			Oats.		
	1898.	1897.	1896.	1898.	1897.	1896.	1898.	1897.	1896.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Jan. 1 -	34 6	30 6	25 2	27 3	24 8	24 7	17 1	16 2	13 10
,, 8 -	34 11	31 1	25 4	27 9	25 5	23 11	16 10	16 3	13 9
,, 15 -	35 0	31 8	25 10	27 8	24 10	23 6	17 4	16 5	13 11
,, 22 -	34 11	31 7	26 1	27 10	25 5	23 7	17 5	16 6	13 10
,, 29 -	34 6	31 3	26 3	27 8	24 7	23 1	17 2	16 8	14 1
Feb. 5 -	34 10	30 7	26 4	28 0	24 10	22 5	17 6	16 7	14 0
,, 12 -	35 1	29 8	26 7	27 8	24 8	21 11	17 5	16 6	14 0
,, 19 -	35 0	28 11	26 3	27 11	23 9	21 10	17 8	16 5	13 9
,, 26 -	35 5	28 2	25 6	27 6	23 8	21 10	17 10	16 3	13 10
Mar. 5 -	35 10	28 3	25 4	28 0	23 0	21 5	17 11	16 3	13 8
,, 12 -	35 8	27 11	25 5	27 10	22 11	21 3	17 9	16 2	13 10
,, 19 -	35 6	27 11	25 1	28 0	22 8	21 1	17 10	16 2	13 9

CORN PRICES :—ANNUAL AVERAGES.

AVERAGE PRICES of **British Corn** per Quarter of 8 imperial bushels, computed from the Weekly Averages of Corn Returns from the 196 Returning Markets, together with the QUANTITIES returned as sold at such Markets during each of the Years 1893 to 1897.

YEARS.	PRICES.			QUANTITIES.		
	Wheat.	Barley.	Oats.	Wheat.	Barley.	Oats.
	s. d.	*s. d.*	*s. d.*	*Quarters.*	*Quarters.*	*Quarters.*
1893 - - -	26 4	25 7	18 9	2,620,060	3,366,056	575,522
1894 - - -	22 10	24 6	17 1	1,956,824	2,729,348	565,747
1895 - -	23 1	21 11	14 6	1,928,383	3,426,576	665,939
1896 - -	26 2	22 11	14 9	2,111,021	3,391,862	655,153
1897 - - -	30 2	23 6	16 11	2,756,561	3,257,187	550,434

AVERAGE VALUE per IMPERIAL QUARTER of WHEAT IMPORTED into the UNITED KINGDOM from the under-mentioned Foreign Countries and British Possessions in the Fourth Quarter of 1897, with the Average Price for the Year.

COUNTRIES from which Exported.	Average Value per Imperial Quarter.	
	Fourth Quarter. 1897.	The Year.
	s. *d.*	*s.* *d.*
ARGENTINE REPUBLIC	—	29 4
CHILE	37 0	31 5
ROUMANIA	35 6	29 9
RUSSIA	34 9	31 0
TURKEY	32 9	30 1
U.S. OF AMERICA { Atlantic	35 10	33 0
U.S. OF AMERICA { Pacific	38 8	31 0
INDIA, BRITISH	36 6	36 2
NORTH AMERICA, BRITISH	35 11	33 4

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER in FRANCE, and ENGLAND and WALES in the under-mentioned Months of 1897 and 1898.

MONTH.	FRANCE.	ENGLAND.
	WHEAT.	
	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
December, 1897	49 10	33 11
January, 1898	49 7	34 9
February	50 0	35 1
	BARLEY.	
	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
December, 1897	23 9	26 3
January, 1898	23 10	27 7
February	24 3	27 9
	OATS.	
	Per Qr. *s.* *d.*	Per Qr. *s.* *d.*
December, 1897	19 9	16 9
January, 1898	20 1	17 2
February	20 6	17 7

Note.—The prices of French grain have been compiled from the official weekly averages published in the *Journal d'Agriculture Pratique*. The prices of British grain are official averages based on the weekly returns furnished under the Corn Returns Act, 1882.

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER in BELGIUM in the under-mentioned Months of 1897, with the mean of the year.

Month.	Wheat.	Barley.	Oats.
1897.	s. d.	s. d.	s. d.
October	34 9	21 10	17 7
November	35 10	22 8	17 7
December	35 8	22 7	17 7
Mean of the year	31 6	20 11	18 2

The above prices have been compiled from the official monthly averages published in the *Moniteur Belge*.

AVERAGE PRICES of WHEAT, BARLEY, and OATS per IMPERIAL QUARTER at the under-mentioned Markets in the under-mentioned Months of 1897 and 1898.

Month.	London.	Paris.	Breslau.
WHEAT.			
	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d.
December, 1897	34 5	49 0	37 1
Mean of the year 1897	31 4	41 7	35 2
January, 1898	35 11	50 6	
February	35 9	50 9	
BARLEY.			
	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d.
December, 1897	28 7	23 2	25 2
Mean of the year 1897	26 3	21 8	23 5
January, 1898	28 11	23 4	
February	25 8	23 3	
OATS.			
	Per Qr. s. d.	Per Qr. s. d.	Per Qr. s. d.
December, 1897	18 1	19 [illegible]	18 4
Mean of the year 1897	17 9	18 1	18 7
January, 1898	18 2	19 8	
February	18 7	19 6	

Note.—The London quotation represents the price of British corn as returned under the Corn Returns Act, 1882; the price of grain in Paris is the official average price of French wheat in that city; the quotations shown for Breslau represent the prices of grain of good merchantable quality.

III.—PRICES OF BUTTER, MARGARINE, AND CHEESE.

MEAN WHOLESALE PRICES of BUTTER, MARGARINE, and CHEESE in the under-mentioned Months of 1897 and 1898.

(Compiled from the *Grocer*.)

DESCRIPTION.	December. 1897.	January. 1898.	February. 1898.
	Per Cwt.	Per Cwt.	Per Cwt.
BUTTER :	*s. d.* *s. d.*	*s. d.* *s. d.*	*s. d.* *s. d.*
Cork, 1sts	102 9 —	102 7 —	110 6 —
,, 2nds	87 6 —	98 7 —	102 9 —
,, 3rds	75 0 —	86 0 —	87 6 —
,, 4ths	61 9 —	63 0 —	62 0 —
Friesland	95 0 to 98 0	96 10 to 100 0	107 0 to 109 0
Dutch Factories	98 6 ,, 102 0	98 6 ,, 101 6	105 6 ,, 108 0
French Baskets	104 0 ,, 110 0	106 0 ,, 113 0	112 0 ,, 120 0
,, Crocks and Firkins	93 6 ,, 99 0	94 0 ,, 100 0	100 0 ,, 108 0
,, 2nds and 3rds	85 6 ,, 89 6	86 0 ,, 90 0	84 0 ,, 96 0
Danish and Swedish	111 0 ,, 115 0	105 0 ,, 109 0	110 6 ,, 113 0
Finnish	82 6 ,, 104 6	77 0 ,, 100 6	85 6 ,, 104 0
Russian	70 0 ,, 93 0	69 0 ,, 89 0	68 0 ,, 89 0
Canadian and States	56 0 ,, 99 0	56 0 ,, 96 6	59 0 ,, 95 6
Argentine	97 6 ,, 108 6	99 6 ,, 106 6	89 6 ,, 103 0
Colonial	60 0 ,, 104 6	60 0 ,, 98 0	64 6 ,, 104 6
Fresh Rolls (Foreign) per doz.	10 9 ,, 14 3	10 11 ,, 14 1	10 6 ,, 15 0
MARGARINE :			
Margarine	28 0 ,, 56 0	28 0 ,, 56 0	28 0 ,, 56 0
Mixtures	52 0 ,, 80 0	52 0 ,, 80 0	51 6 ,, 80 0
CHEESE :			
Cheddar	47 0 ,, 71 6	49 0 ,, 72 0	50 0 ,, 70 0
Somerset	52 0 ,, 66 0	52 0 ,, 66 0	52 0 ,, 64 6
Cheshire	60 0 ,, 76 0	62 6 ,, 78 6	66 0 ,, 80 0
Wiltshire	60 0 ,, 63 6	54 6 ,, 64 0	56 0 ,, 64 0
Double Gloucester	48 6 ,, 60 0	48 0 ,, 60 0	48 6 ,, 59 6
Derby	56 0 ,, 60 0	56 0 ,, 60 0	—

WEEKLY PRICES (WHOLESALE) of VEGETABLES and FRUIT at COVENT GARDEN MARKET.

(Compiled from the *Gardeners' Chronicle.*)

—	Week ending							
	3rd. Feb.		10th Feb.		17th Feb.		24th Feb.	
VEGETABLES—	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Artichokes, Globe, per dozen	1 0 to	1 9	2 6	—	2 0	—	2 6 to	3 0
Asparagus, English, per bundle, 100 heads	—	—	6 0 to	8 0	6 0 to	7 0	7 0 ,,	8 0
Asparagus, Paris, Green	3 6	—	4 6	—	3 9 ,,	4 3	4 9 ,,	5 0
Beans, English, per lb.	—	—	—	—	—	—	1 3 ,,	1 6
Beans, Kidney, Channel Islands, per lb.	1 0 ,,	1 3	1 6 ,,	1 9	1 3 ,,	1 6	1 4 ,,	1 6
Beetroots, per bushel	1 6	—	1 6	—	1 6	—	1 6	—
Broccoli, per dozen	1 0 ,,	1 6	1 0 ,,	1 6	1 0 ,,	1 6	1 0 ,,	1 6
Broccoli, Italian, package of 18	3 3	—	4 0	—	3 0 ,,	3 3	3 0 ,,	3 6
Carrots, English bags per cwt.	2 0 ,,	3 0	2 0 ,,	3 0	2 0 ,,	2 6	2 0 ,,	2 6
Celery, per dozen bundles	10 0 ,,	15 0	10 0 ,,	15 0	10 0 ,,	15 0	10 0 ,,	15 0
Cucumbers, selected, per dozen	10 0 ,,	12 0	10 0 ,,	12 0	8 0 ,,	10 0	7 0 ,,	8 0
Endive, French, per dozen	1 3	—	1 9	—	1 2 ,,	1 4	0 10 ,,	1 6
Horseradish, per bundle	0 9 ,,	0 10	0 9 ,,	0 10	0 9 ,,	0 10	0 9 ,,	0 10
Kale, Scotch, per bag	1 0	—	0 9	—	0 9 ,,	1 6	0 9 ,,	1 6
Lettuce, per dozen	—	—	0 8	—	1 0 ,,	1 3	0 9 ,,	1 0
Mushrooms, per lb.	0 6 ,,	0 7	0 8	—	0 8	—	0 8 ,,	0 9
Onions, per bag	5 0 ,,	6 6	9 0 ,,	9 6	6 0 ,,	6 6	6 0 ,,	6 6
Onions, Dutch, per bag	5 0	—	5 0 ,,	6 6	5 3 ,,	6 6	5 0	—
Parsnips, per bag (cwt.)	—	—	2 0	—	2 0 ,,	2 6	2 0 ,,	2 6
Peas, French, per lb.	0 4	—	0 4	—	0 4	—	0 6	—
Potatoes, French Kidneys, 24 lb. box	6 0	—	6 0	—	6 0	—	6 0	—
Potatoes, New Kidneys, Channel Islands, per lb.	0 6 ,,	0 8	0 6 ,,	0 8	0 5 ,,	0 8	0 6 ,,	0 7
Potatoes, Canary, per cwt.	18 0 ,,	21 0	18 0 ,,	21 0	14 0 ,,	16 0	10 0 ,,	15 0
Potatoes, Maincrop and Saxons, per ton	100 0 ,,	120 0	100 0 ,,	120 0	100 0 ,,	115 0	100 0 ,,	120 0
Potatoes, Magnums and Bruce, per ton	95 0 ,,	110 0	100 0 ,,	110 0	90 0 ,,	110 0	90 0 ,,	110 0
Potatoes, Dunbar Maincrop, per ton	125 0 ,,	130 0	125 0 ,,	130 0	—	—	120 0 ,,	125 0
Potatoes, Blackland, per ton	90 0 ,,	100 0	90 0 ,,	100 0	90 0 ,,	95 0	90 0 ,,	95 0
Radishes, Long, per dozen bunches	0 6 ,,	0 9	0 6 ,,	0 9	0 6 ,,	0 9	0 6 ,,	0 9
Rhubarb, dozen bundles	0 10 ,,	1 1	1 3 ,,	1 6	1 3 ,,	1 9	1 0 ,,	1 3
Salad, small, dozen bunches	1 6	—	1 6	—	1 3	—	1 3	—
Seakale, per dozen	9 0 ,,	11 0	10 0 ,,	13 0	10 0 ,,	13 0	10 0 ,,	12 0
Spinach, per bls.	—	—	2 0	—	1 4 ,,	3 0	1 6 ,,	2 0
Sprouts, Brussels, per sieve	0 9 ,,	1 0	0 9 ,,	1 0	0 9 ,,	1 0	1 0 ,,	1 3
Tomatoes, English, per lb.	1 6	—	1 3 ,,	1 6	1 3 ,,	1 6	1 3 ,,	1 6
Tomatoes, case about 40 lbs.	14 0	—	10 0 ,,	12 0	10 0 ,,	12 0	10 0 ,,	12 0
Turnips, per bag	1 6 ,,	2 6	1 6 ,,	2 6	1 6 ,,	2 6	2 0 ,,	2 6
Turnip Tops, per bag	1 6	—	1 6	—	1 6	—	1 6	—
Watercress, per dozen	0 6 ,,	0 9	0 6 ,,	0 9	0 6 ,,	0 8	0 6 ,,	0 8
FRUIT—								
Apples (Californian), box of 40 lbs.	11 0	—	11 0	—	11 0	—	—	—
Apples (Newtown Pippins), half-boxes	9 0 ,,	9 6	9 0 ,,	9 6	9 0 ,,	9 6	—	—
Apples (Canadian), barrels	24 0 ,,	28 0	18 0 ,,	24 0	18 0 ,,	30 0	27 6	—
Apples (Golden Russets), per bag	24 0 ,,	25 0	24 0 ,,	25 0	24 0 ,,	25 0	26 0	(barrels)
Apples (Nova Scotia), barrels	17 0 ,,	23 0	16 0 ,,	21 0	16 0 ,,	18 0	17 0 ,,	20 0
Apples, home-grown, per bushel	8 0 ,,	12 0	8 0 ,,	12 0	5 0 ,,	8 0	5 0 ,,	8 0
Grapes, Black Alicante, per lb.	2 0 ,,	3 0	2 0 ,,	3 0	2 6 ,,	3 0	2 9 ,,	3 6
Grapes, Gros Colmar, per lb.	3 0 ,,	3 6	2 6 ,,	3 6	2 3 ,,	2 9	—	—
Grapes, Gros Colmar, second quality, per lb.	2 6 ,,	3 0	2 3 ,,	2 6	2 3 ,,	2 6	—	—
Grapes, Belgium, per lb.	1 0 ,,	1 3	1 0 ,,	1 3	1 4 ,,	2 0	—	—
Grapes, Almerias, per 12 lbs.	6 0 ,,	8 0	6 0 ,,	8 0	6 0 ,,	8 0	7 0 ,,	10 0
Peaches, Cape, per case, containing 15 to 28	—	—	—	—	—	—	4 0 ,,	12 0
Pears, Californian, per case	28 0	—	28 0	—	28 0	—	—	—
Pineapples, each	—	—	—	—	2 0 ,,	5 0	1 6 ,,	4 6
Pineapples, per case, containing 6 to 8 each	3 6 ,,	5 0	3 0 ,,	5 0	3 0 ,,	5 0	—	—

DISEASES OF ANIMALS IN GREAT BRITAIN.

NUMBER of OUTBREAKS of **Pleuro-Pneumonia** and of **Swine-Fever**, with the Number of CATTLE and SWINE Slaughtered by order of the Board of Agriculture, in GREAT BRITAIN in each of the under-mentioned periods.

QUARTER ENDED	Pleuro-Pneumonia.			Swine-Fever.	
	OUTBREAKS Confirmed.	CATTLE found Diseased.	CATTLE Slaughtered as having been exposed to Infection.	OUTBREAKS Confirmed.	SWINE Slaughtered as Diseased, or as having been exposed to Infection.
	No.	*No.*	*No.*	*No.*	*No.*
26 December, 1896 -	—	—	—	815	15,806
27 March, 1897 -	2	14	450	785	13,544
26 June, 1897 -	3	25	197	700	13,131
25 September, 1897 -	1	4	71	392	8,026
25 December, 1897 -	1	3	23	278	5,731

NUMBER of OUTBREAKS reported as having taken place, and Number of ANIMALS returned as having been ATTACKED by **Anthrax** and **Glanders** in GREAT BRITAIN in each of the under-mentioned periods.

QUARTER ENDED	Anthrax.		Glanders (including Farcy).	
	OUTBREAKS Reported.	ANIMALS Attacked.	OUTBREAKS Reported.	ANIMALS Attacked.
	No.	*No.*	*No.*	*No.*
26 December, 1896 - -	118	219	213	331
27 March, 1897 - -	129	306	196	341
26 June, 1897 - -	109	201	230	393
25 September, 1897- -	93	171	249	437
25 December, 1897 - -	102	204	225	458

NUMBER OF CASES of **Rabies** in DOGS in GREAT BRITAIN during each of the under-mentioned periods.

THREE MONTHS ENDED	Number of Cases.
31st December, 1896 - - - -	49
31st March, 1897 - - - - -	48
30th June, 1897 - - - - -	42
30th September, 1897 - - - -	40
31st December, 1897 - - - -	21

DISEASES OF ANIMALS IN IRELAND.

NUMBER of OUTBREAKS of **Pleuro-Pneumonia** and of **Swine-Fever,** with the Number of CATTLE and SWINE Slaughtered by order of the Lord Lieutenant and Privy Council in IRELAND, in each of the under-mentioned periods.

QUARTER ENDED	Pleuro-Pneumonia.			Swine-Fever.	
	OUTBREAKS Confirmed.	CATTLE found Diseased.	CATTLE Slaughtered as having been exposed to Infection.	OUTBREAKS Confirmed.	SWINE Slaughtered as Diseased, or as having been exposed to Infection.
	No.	*No.*	*No.*	*No.*	*No.*
26 December, 1896 -	—	—	—	60	2,794
27 March, 1897 -	—	—	142	122	1,149
26 June, 1897 - -	—	—	—	136	1,571
25 September, 1897 -	—	—	—	120	749
25 December, 1897 -	—	—	—	38	655

NUMBER of OUTBREAKS reported as having taken place, and Number of ANIMALS returned as having been ATTACKED by **Anthrax, Glanders,** and **Rabies** in Ireland in each of the under-mentioned periods.

QUARTER ENDED	Anthrax.		Glanders (including Farcy).		Rabies.	
					CASES REPORTED.	
	OUTBREAKS REPORTED.	ANIMALS ATTACKED.	OUTBREAKS REPORTED.	ANIMALS ATTACKED.	DOGS.	OTHER ANIMALS.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
26 Dec., 1896 -	—	—	—	1	74	29
27 March, 1897 -	—	—	—	—	118	19
26 June, 1897 -	1	1	1	2	139	41
25 Sept., 1897 -	—	—	1	1	110	29
25 Dec., 1897 -	—	—	—	—	26	16

PRICES OF WOOL.

PRICES OF ENGLISH WOOL, per pack of 240 lbs., in the under-mentioned Months of 1897 and 1898.

(Compiled from the *Economist.*)

DESCRIPTION.	December, 1897.	January, 1898.	February, 1898.
	£ s. to £ s.	£ s. to £ s.	£ s. to £ s.
South Down - -	9 7 to 10 0	9 0 to 10 0	9 0 to 10 0
Half breds -- -	8 10 ,, 9 14	8 10 ,, 9 10	8 10 ,, 9 8
Leicester - - -	8 10 ,, 9 12	8 10 ,, 9 5	8 10 ,, 9 3
Kent Fleeces - -	8 0 ,, 9 9	8 0 ,, 9 5	8 0 ,, 9 3

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Number.	Title.
Leaflet No. 1	Mites on Currant and Nut Trees.
,, ,, 2	Vine and Raspberry Weevils.
,, ,, 3	The Turnip Fly or Flea.
,, ,, 4	Caterpillars on Fruit Trees.
,, ,, 5	The Mangel Wurzel Fly.
,, ,, 6	The Field Vole.
,, ,, 7	Autumn Catch Crops and Fodder Supply.
,, ,, 8	Farmers and Assessments to Local Rates.
,, ,, 9	Ensilage.
,, ,, 10	Wireworms.
,, ,, 11	The Daddy Longlegs.
,, ,, 12	The Gooseberry Saw-Fly.
,, ,, 13	Acorn Poisoning.
,, ,, 14	The Raspberry Moth.
,, ,, 15	The Apple Blossom Weevil.
,, ,, 16	The Apple Sucker.
,, ,, 17	Preservation of Commons.
,, ,, 18	Fertilisers and Feeding Stuffs Act, 1893.
,, ,, 19	Pea and Bean Weevil.
,, ,, 20	The Magpie Moth.
,, ,, 21	The Warble Fly.
,, ,, 22	The Diamond Back Moth.
,, ,, 23	Potato Disease.
,, ,, 24	The Ribbon Footed Corn-Fly.
,, ,, 25	The Cockchafer.
,, ,, 26	Farmers and the Income Tax.
,, ,, 27	Remission of Tithe Rentcharge.
,, ,, 28	Anthrax.
,, ,, 29	Swine Fever.
,, ,, 30	The Codlin Moth.
,, ,, 31	The Onion Fly.
,, ,, 32	Foul Brood or Bee Pest.
,, ,, 33	Surface Caterpillars.
,, ,, 34	The Woolly Aphis or American Blight
,, ,, 35	The Celery Fly.
,, ,, 36	Cultivation of Osiers.
,, ,, 37	Rabies.
,, ,, 38	The Carrot Fly.
,, ,, 39	Assessments to Land Tax.
,, ,, 40	The Kestrel or Windhover.
,, ,, 41	The Sparrow-hawk.
,, ,, 42	The Short-eared Owl.
,, ,, 43	Titmice.
,, ,, 44	The Common Lapwing or Plover.
,, ,, 45	The Starling.

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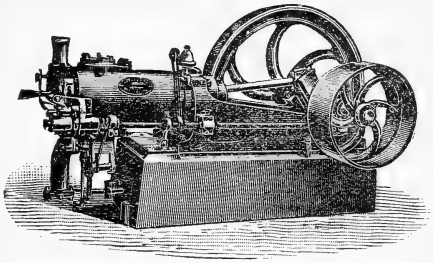
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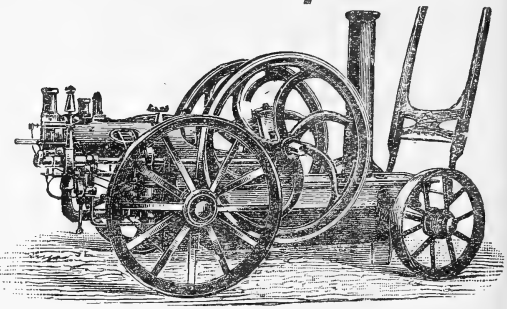
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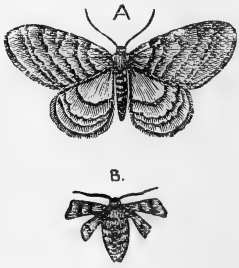
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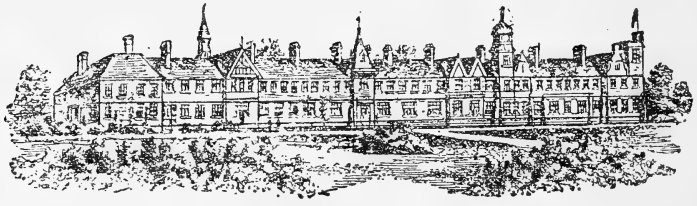
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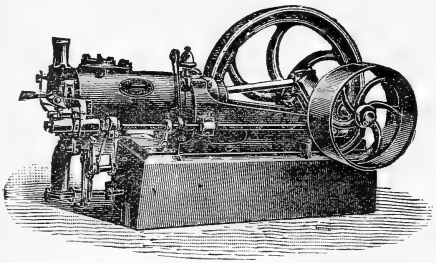
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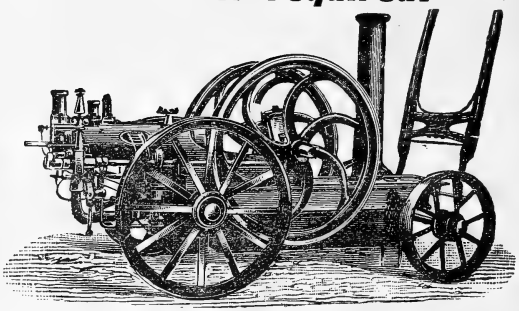
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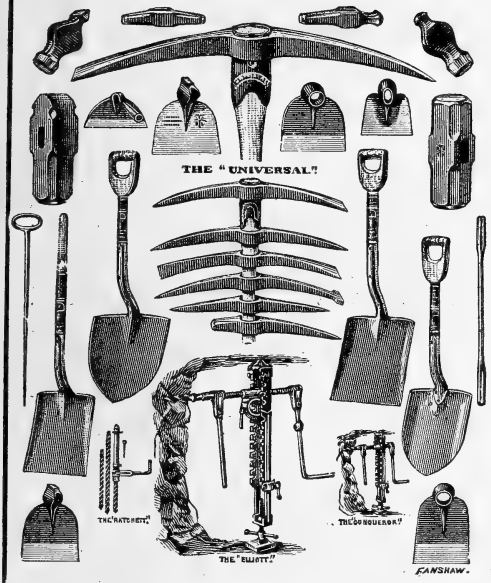
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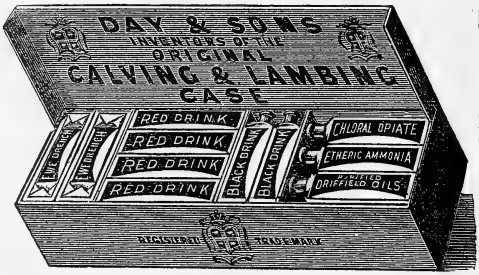
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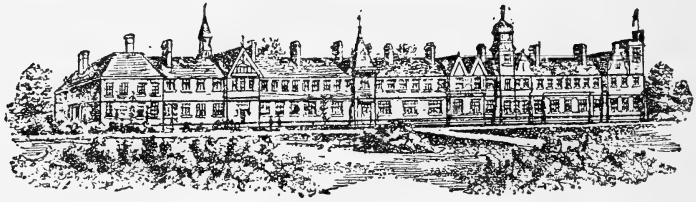
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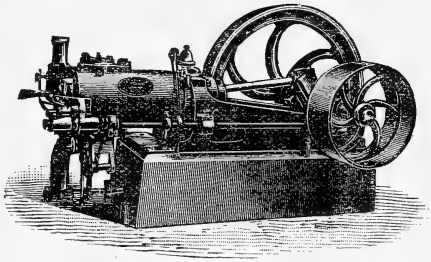
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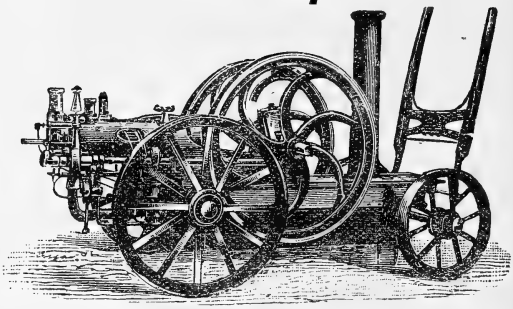
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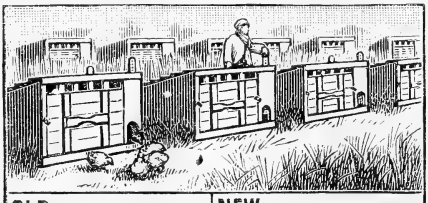
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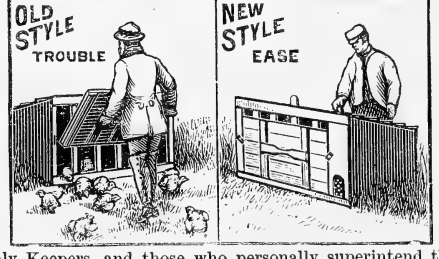
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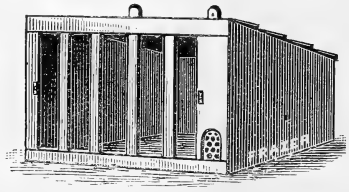
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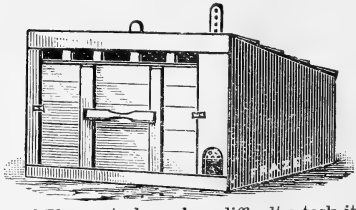
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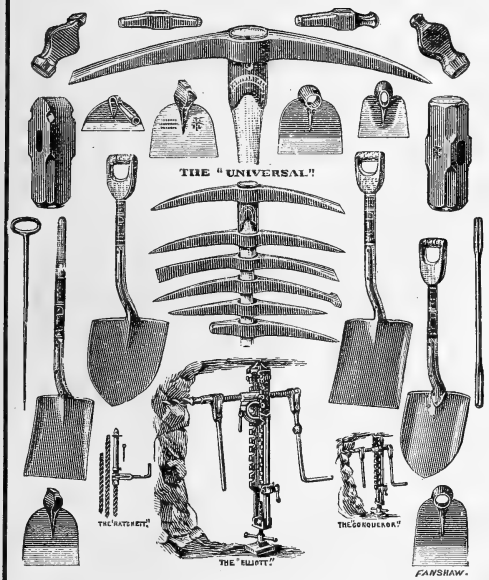


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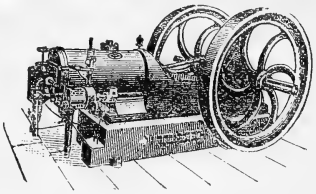
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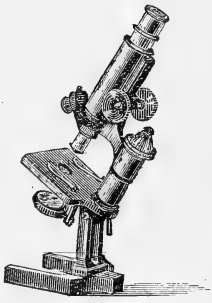
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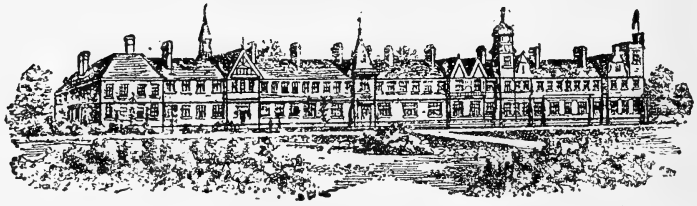
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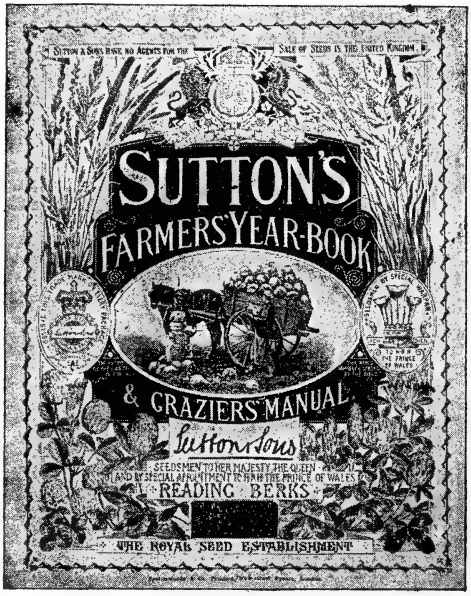
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